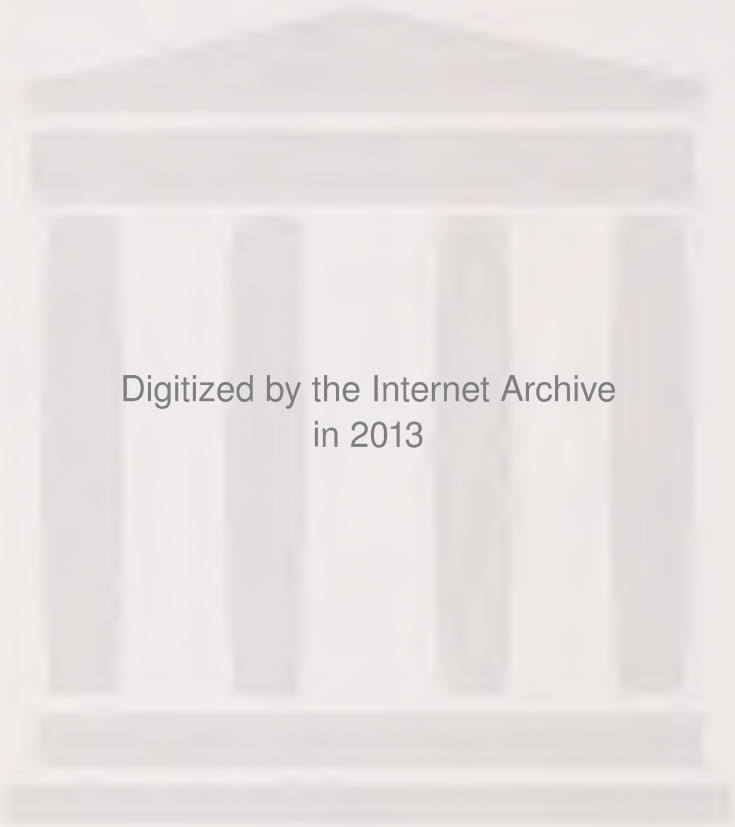
CLEMSON UNIVERSITY

RECORD

NINETY-FIRST YEAR

CATALOG NUMBER

1983-1984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CLEMSON UNIVERSITY

Undergraduate Announcements
1983-84

1982-83 RECORD — Ninetieth Year Vol. 58
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UNIVERSITY CALENDAR

FALL SEMESTER 1982

August 16	Orientation
August 17	Registration
August 18	Late registration
August 19	Classes begin; late registration fee applies
August 25	Last day to register; last day to add a subject
September 8	Last day to order diploma for December graduation
September 15	Last day to drop a subject without record of withdrawal
October 11	Preliminary grade reports due
October 29	Last day to drop a subject or withdraw from the University without receiving final grades
November 1-2	Fall break
November 8-12	Preregistration
November 25-26	Thanksgiving holidays
December 8	Reading day
December 9-11, 13-15	Examinations
December 21	Graduation

SPRING SEMESTER 1983

January 6	Orientation
January 7	Registration
January 8	Late registration
January 10	Classes begin; late registration fee applies
January 14	Last day to register; last day to add a subject
January 28	Last day to order diploma for May commencement
February 4	Last day to drop a subject without record of withdrawal
February 28	Preliminary grade reports due
March 14-18	Spring break
March 25	Last day to drop a subject or withdraw from the University without receiving final grades
April 10	Honors and Awards Day
April 11-15	Preregistration
May 2-7	Examinations
May 13	Commencement

FIRST SUMMER SESSION 1983

May 23	Registration
May 24	Classes begin; late registration fee applies
May 25	Last day to register
May 28	Classes meet
May 31	Last day to drop a subject without record of withdrawal
June 11	Classes meet
June 13	Last day to drop a subject or withdraw from the University without receiving final grades
June 24	Examinations

SECOND SUMMER SESSION 1983

June 27	Orientation
June 28	Registration
June 29	Classes begin; late registration fee applies
June 30	Last day to register
July 4	Holiday
July 8	Last day to drop a subject without record of withdrawal
July 9	Classes meet
July 21	Last day to drop a subject or withdraw from the University without receiving final grades
August 3	Examinations
August 6	Graduation

FALL SEMESTER 1983

August 15	Orientation
August 16	Registration
August 17	Late registration
August 18	Classes begin; late registration fee applies
August 24	Last day to register; last day to add a subject
September 7	Last day to order diploma for December graduation
September 14	Last day to drop a subject without record of withdrawal
October 10	Preliminary grade reports due
October 28	Last day to drop a subject or withdraw from the University without receiving final grades; fall break begins after last class
November 2	Classes resume
November 7-11	Preregistration
November 23	Thanksgiving holiday begins after last class
November 28	Classes resume
December 7	Reading day
December 8-10, 12-14	Examinations
December 20	Graduation

SPRING SEMESTER 1984

January 5	Orientation
January 6	Registration
January 7	Late registration
January 9	Classes begin; late registration fee applies
January 13	Last day to register; last day to add a subject
January 27	Last day to order diploma for May commencement
February 3	Last day to drop a subject without record of withdrawal
February 27	Preliminary grade reports due
March 16	Last day to drop a subject or withdraw from the University without receiving final grades; spring break after last class
March 26	Classes resume
April 7	Honors and Awards Day
April 9-13	Preregistration
April 30-May 5	Examinations
May 11	Commencement

FIRST SUMMER SESSION 1984

May 17	Registration
May 18	Classes begin; late registration fee applies
May 21	Last day to register
May 28	Last day to drop a subject without record of withdrawal
June 11	Last day to drop a subject or withdraw from the University without receiving final grades
June 22	Examinations

SECOND SUMMER SESSION 1984

June 25	Orientation
June 26	Registration
June 27	Classes begin; late registration fee applies
June 28	Last day to register
July 4	Holiday
July 6	Last day to drop a subject without record of withdrawal
July 7	Classes meet
July 19	Last day to drop a subject or withdraw from the University without receiving final grades
August 1	Examinations
August 4	Graduation

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CLEMSON UNIVERSITY

GENERAL INFORMATION

Clemson is a land-grant, state-supported university, fully accredited by the Southern Association of Colleges and Schools. Curricula are accredited by Accreditation Board for Engineering and Technology, American Assembly of Collegiate Schools of Business, National Architectural Accrediting Board, National Council for Accreditation of Teacher Education, National League for Nursing, and Society of American Foresters.

The sixty-two undergraduate and sixty-one graduate degree programs under the colleges of Agricultural Sciences, Architecture, Commerce and Industry, Education, Engineering, Forest and Recreation Resources, Liberal Arts, Nursing, Sciences, and the Graduate School form a background of training for the hundreds of occupations and professions in which Clemson graduates engage. The University is organized on a basis whereby it retains a clear entity through the interrelationships of colleges and departments providing a well-balanced fundamental and general educational program.

The enrollment of Clemson has grown from 446 students at the opening of the University in 1893, to 12,093 for the first semester, 1982-83. Since the opening of the University through the first semester, 1982-83, 98,111 students have attended Clemson, and of this number, 40,595 have been awarded the bachelor's degree. During this same period 426 associate degrees, 8,360 master's degrees, 659 Doctor of Philosophy degrees, and 105 Education Specialist degrees have been awarded.

ADMINISTRATIVE ORGANIZATION

The government of the University is vested in a Board of thirteen members, including six elected by the Legislature and seven life and self-perpetuating members, in accord with the Clemson will. The President of the University is the chief executive and administrative officer elected by the Board of Trustees; and under the President there are six areas of administration, each headed by a chief administrative officer responsible to the President. The organizational units under each of these officers are outlined as follows:

I. Provost and Vice President for Academic Affairs
   A. Undergraduate Studies
      1. Honors Programs
      2. Summer Sessions and Career Workshops
      3. University Library
   B. Graduate School
   C. University Research
   D. Colleges
      1. Agricultural Sciences

2. Architecture
3. Commerce and Industry
4. Education
5. Engineering
6. Forest and Recreation Resources
7. Liberal Arts
8. Nursing
9. Sciences

E. Institutes
1. The Belle W. Baruch Forest Science Institute
2. Housing Institute
3. Water Resources Research Institute

II. Vice President for Business and Finance
A. Budgets and Planning
B. Campus Master Planning
C. Facilitating Services
D. Financial Management
E. Physical Plant
F. Public Safety

III. Vice President for Student Affairs and Dean of Students
A. Admissions, Registration, and Financial Aid
B. Athletic Department
C. Bookstore and Canteens
D. Career Services
E. Counseling and Career Planning
F. Housing
G. Littlejohn Coliseum
H. Music Activities
I. Student Health Service
J. Student Life
K. Union

IV. Vice President for Institutional Advancement
A. Executive Director of University Relations
1. Audio/Visual Services
2. Extension Educational Resources Center
3. Fort Hill (Calhoun Mansion)
4. Hanover House
5. Internal Communications Program
6. News Services
7. Photographic Services
8. Publications and Graphics Services
9. Radio/Television Production
10. Tour Services
11. Visitors Center

B. Alumni Relations and Resources Development
C. Clemson University Foundation

V. Executive Officer to the President's Office and Secretary of the Board of Trustees
   A. University Counsel
   B. Human Resources
VI. Executive Assistant to the President
   A. Computer Center
   B. Division of Administrative Programming Services
   C. Division of Information Systems Development

ADMISSION

Beginning Freshmen To receive consideration for admission to Clemson, the applicant must present a transcript of his high school record and have an official copy of his Scholastic Aptitude Test (SAT) scores sent to the Office of Admissions directly from the College Board Office in Princeton, New Jersey.

The examination scores, along with the student's academic preparation, rank in class, and recommendation of the high school counselor will be weighed carefully in the admissions decision process. The applicant's acceptance will be confirmed upon presentation of a final high school transcript indicating a continuation of progress and graduation.

In addition, a student who has not received or does not intend to receive a high school diploma may qualify for entrance by:

1. Achieving satisfactory scores on the SAT and presenting a high school certificate (awarded by certificate examination) from the state in which he resides. This provision applies only to candidates 19 or more years of age.

2. Demonstrating unusual academic ability as an applicant who does not intend to graduate from high school. In special cases consideration may be given to younger candidates who possess superior high school records and whose SAT scores are above average for the freshman class. The typical student admitted under this provision ranks in the upper tenth of his class and has SAT scores which total 1100 or more.

Transfer Candidates All transfer applicants must have an original transcript of their records sent to Clemson directly from each college or university attended. Unless so stated on the transcript, the candidate will need to present statements of honorable dismissal and of eligibility to return to the institution last attended. Generally, only candidates who have accumulated 30 semester (45 quarter) hours of work will be considered for admission. SAT scores are required of some transfer students, and high school transcripts may also be required in a few instances. Candidates concerned will be notified individually if either or both of these credentials are needed.

Applicants meeting the requirements outlined above will be considered carefully with regard to the quality of their credentials. If accepted, work completed at other institutions with a grade of C or higher will be evaluated for transfer in terms of equivalent courses in the Clemson curriculum of one's choice.

All Applicants Various nonintellective factors will be considered in a few cases where it is impossible to make a positive decision on the basis of SAT scores and previous academic performance alone.

Special Student Status The special student classification is primarily designed for high school graduates or persons at least 19 years of age who are not interested in pursuing a degree. None of the usual credentials supporting an application are required of such applicants. A maximum of 15 undergraduate credit hours can be taken during a semester or summer session. Applicants denied regular admission to Clemson are not eligible to apply as special candidates.

Although it is possible to reenroll in immediately succeeding semesters up to the cumulative maximum of 15 credit hours, one must submit a new application for each entrance period. Moreover, preregistration is prohibited inasmuch as regular Clemson students have priority for enrollment in all courses.

Special students who have completed 15 hours or less may apply to Clemson under regular admission requirements. If admitted, work previously taken in this classification will apply toward a degree at Clemson only if the courses are applicable to the curriculum chosen.

This admissions status is not to be confused with that of the transient student who regularly attends another college or university and has received permission to enroll at Clemson for specific courses to be transferred back to that institution.

Application Forms and Dates Application forms may be obtained by writing to the Office of Admissions, Clemson University, Clemson, South Carolina 29631. Application forms and catalogs for all 1984 entry dates are available beginning September 1983. Preliminary application forms are available anytime for those who wish to be included in the September mailing, and freshman candidates are especially encouraged to submit preliminary applications and sit for the Scholastic Aptitude Test (SAT) during the spring semester of their junior year.

There is no established application deadline or cutoff date for submitting the necessary credentials. However, candidates should understand that admission is closed when all classroom space has been committed. Although the time of application does not specifically control the time one receives a decision, the majority of freshman admissions decisions are reached during the period November through March. Transfer students entering in August usually are notified February through July.

Application Fee Candidates must submit a nonrefundable fee of $15 with their applications. This fee is not applicable toward tuition and/or other University fees.

Housing Applications Forms for requesting University housing are enclosed with admissions applications and must be returned directly to the Housing Office. Upon receipt of a request, Housing Office personnel will forward further information and contracts in the order in which the requests are received. Once all facilities appear to be committed, stu-

dents will be notified that their names have been added to the waiting list.

Candidates receiving housing contracts must complete and return the form with a $75 housing deposit. Those returning these items who subsequently are accepted for admission are guaranteed housing. The $75 deposit will be refunded to students who reserved housing but are denied admission to the University.

University housing is limited and cannot be guaranteed to all entering students. Transfer students entering in August cannot be housed until January, and only about three-fourths of the freshmen can be accommodated during the fall semester.

Entrance Examinations All freshman candidates and some transfer students must submit scores for the SAT. A student transferring from an accredited college usually need not submit SAT scores if he has earned thirty or more transferable semester hours with a B- or greater average, based on a system using four passing grades. Those enrolled in technical programs at technical and community colleges usually will be required to submit SAT scores.

For August enrollment, it is recommended that students complete the SAT no later than the preceding November.

Candidates who have completed the required tests previously may have their scores reported to Clemson by directing a request to the College Board. Others may secure a *College Board Student Bulletin* and an application for the tests from their local high school or from the Board's Office, P.O. Box 592, Princeton, New Jersey 08541. *Copies of student reports and those submitted by third parties, such as high schools and colleges, are not acceptable.*

Although almost all freshmen must take at least one College Board Achievement Test, as explained in the next section, *those attending high schools which do not compute class rank definitely should take three tests (English, Mathematics II, and one other of their choice).* These students must take them by January of their senior year, as the scores will be used in reaching an admissions decision in such cases.

Achievement Tests Almost all freshmen will find that one or more of the College Board Achievement Tests are required or at least highly desirable for placement purposes. Since a candidate can take one, two, or three tests at the same administration without an increase in the test fee, all are encouraged to sit for three tests. The information provided by these results becomes an extra credential that may enhance the chance for acceptance, especially if one has made marked academic improvement in the last year or two of high school or if in the lower portion of a selective class. Specific requirements or recommendations are as follows:

Mathematics Candidates whose majors include Mathematical Sciences 101, 102, or 106 as the first required mathematical sciences course and those studying prephysical therapy or prepharmacy should take the College Board Achievement Test in Mathematics (Level II)

unless automatic placement in a review course is desired. This review course does not count toward graduation in some curricula.

Foreign Language Applicants who will have completed two or more years of high school French, German, Latin, Russian, or Spanish and who will enroll in a curriculum which includes a foreign language should take the appropriate language achievement test. These candidates may qualify for advanced placement with credit on the basis of a satisfactory score on this test.

English Test results in English might provide one with an alternate means of gaining advanced placement, as explained below, or serve as an extra credential for the candidate with marginal credentials.

Other Tests Students taking only two of the tests noted above are encouraged to take another one in a subject of their choice.

Advanced Placement by Examination In addition to earning credit by the usual method involving classroom attendance, students may receive credit toward their degrees by completing a course successfully by examination only. The following examination programs are currently recognized:

College Board Advanced Placement (AP) High school students interested in exempting some of the elementary courses are encouraged to participate in the AP Programs at their high schools and have examination results sent to Clemson. Generally, credit for the full year's course is awarded to those who earn a 3, 4, or 5 on the College Board AP examination.

English Departmental Examination The English Department offers a locally administered writing sample to students with scores of 600 and above on the verbal section of the Scholastic Aptitude Test or 650 and greater on the College Board English Achievement Test. Students qualifying will receive written invitations to write an essay before the fall semester begins. Generally, credit for the first semester freshman composition course is awarded for demonstrated proficiency.

College Board College-Level Examination Program (CLEP) A few departments accept credit for CLEP subject-matter examinations. (CLEP General Examinations are not recognized.) Credit is awarded for introductory-level courses according to criteria established by the following departments: Chemistry, Economics, English (composition only), Psychology, and Mathematical Sciences (algebra and trigonometry only—applicable principally in agricultural curricula requiring MTHSC 105). Numerical scores plus essays, required when offered as part of a CLEP examination, will be evaluated for credit by the appropriate department. Through CLEP the typically mature student has an opportunity to obtain credit by examination for adult or correspondence coursework or other nontraditional study. Further information regarding specific tests offered, registration procedures, and costs can be obtained from the University Counseling and Career-Planning Center.

Campus Visits Prospective students are welcome to visit the Clemson campus and talk with the staff, faculty, and students of the University. Individually conducted tours are offered on Monday and Friday after-

noons during the academic year and summer sessions. Appointments are necessary and may be made through the Alumni Center.

Visits can be made to the Admissions Office without an appointment during regular office hours Monday through Friday, 8:00 a.m. to 4:30 p.m. It is best, however, to avoid visiting the campus during the last two weeks of August and the first week of January, as these are class registration periods. The staff and faculty cannot always assist visitors at these times.

Candidates for the College of Architecture are particularly encouraged to come for an interview. Prospective students will have an opportunity to discuss the programs offered with a faculty member and tour the facilities. Appointments should be made in advance by contacting that College.

Interviews are not required in considering candidates, nor will the results of interviews affect admissions decisions. Rather, the purpose is to provide candidates the opportunity to learn more about the University, the programs, and admissions procedures.

Orientation Program The University has scheduled a series of two-day orientation programs during the summer months for entering freshmen, transfer students, and their parents. All accepted students are expected to attend one of these sessions.

During orientation students will have an opportunity to discuss their educational objectives with an adviser, to preregister for the fall semester, and to learn about student life. Transfer students have their transcripts evaluated and select appropriate courses for their first semester at Clemson. Those transferring may find it difficult to schedule the appropriate courses if they fail to attend one of the first six orientation periods. The dates for orientation in 1983 are as follows:

June 6, 7
June 13, 14
June 20, 21
June 27, 28
July 7, 8
July 11, 12
August 15*

Students from Other Countries A limited number of well-qualified students from other countries are accepted. The first step is to file a preliminary application and take the Scholastic Aptitude Test (SAT) of the College Board. After one's scores are reported to Clemson, admissions personnel will make a preliminary evaluation and, if appropriate, send a formal application to the candidate. The student should enclose certified true copies of transcripts of secondary school and college-level records when returning the application.

*The program on this date is an incomplete one, and it is especially inappropriate for transfer students. Only foreign students and American students living great distances from the University should defer orientation until this time.

ADMISSION OF POST-BACCALAUREATE STUDENTS

A student may be accepted by the Graduate School as a post-baccalaureate student if he or she applies to a specific graduate degree program but does not have the appropriate academic background. Such a student must be recommended by the appropriate department or program chairperson and must fully meet all other requirements for admission to the particular degree program with respect to grade-point ratio and standardized test scores. A student in this category who is denied admission because of failure to meet the minimum requirements has access to the same appeal procedures as does any other student applying to the Graduate School.

Applicants will be classified as post-baccalaureate students if they are not qualified to take at least one graduate course per semester which can be included in the minimum hours required for the graduate degree. Additionally, any student required to complete more than eighteen semester hours of undergraduate credits will be classified as post-baccalaureate. Until such time that the required number of undergraduate credit hours is less than or equal to eighteen and the student is qualified to take, each semester, a graduate course which can be included in the minimum hours required for the graduate degree, he or she will remain classified as post-baccalaureate. A department or a student may request post-baccalaureate status even though the above criteria are satisfied.

At the time a post-baccalaureate student becomes eligible for classification as a graduate student, the decision as to eventual admission status (full or provisional) will be made according to criteria utilized by the department and Graduate School for all other applicants to the particular degree program. The post-baccalaureate student is expected to maintain a B average and receive no grade lower than C in order to qualify for admission to a graduate program.

Post-baccalaureate students may enroll in the same number of credits per semester as any undergraduate student but shall not enroll in graduate courses or receive a graduate assistantship. No degree or certificate shall be awarded to students in a post-baccalaureate status and such students who subsequently desire to obtain an additional baccalaureate degree must apply through the Office of Admissions and Registration. The applicability of credits earned toward the undergraduate degree will be determined by the policy pertaining to transfer students. Tuition and fees for post-baccalaureate students shall be those applicable to undergraduates with the exception of the application fee and admissions deposit.

A student possessing an undergraduate degree or a graduate degree and who wishes to enroll in specific undergraduate courses for reasons other than future admission to the Graduate School shall not be classified as post-baccalaureate and shall be governed by policies established by the Office of Admissions and Registration.

GRADUATE STUDY

Programs leading to graduate degrees from Clemson University are available in nine colleges—Agricultural Sciences, Architecture, Commerce and Industry, Education, Engineering, Forest and Recreation Resources, Liberal Arts, Nursing, and Sciences.

For information concerning advanced degrees see *The Graduate School Announcements* which may be obtained from the University Graduate School.

EXPENSES

Establishment of University Fees The annual State Appropriation Act imposes the general requirement that student fees be fixed by the University Board of Trustees. The Act imposes two specific requirements on the Board: (1) In fixing fees applicable to academic and general maintenance and operation costs, the Board must maintain a minimum student fee not less than the fee charged the previous year. (2) In fixing fees applicable to dormitory rental, dining halls, laundry, infirmary, and all other personal subsistence expenses, the Board must charge students an amount sufficient to fully cover the cost of providing such facilities and services.

Settlement of University Fees The Schedule of Semester Charges for all undergraduate students—full or part time, and auditing—is shown on the pages which follow. Satisfactory settlement of all expenses is a requirement for completing each semester's class registration, and no student is officially enrolled until all past due accounts have been satisfied. In special cases the University will accept, at the beginning of a semester, a noninterest bearing promissory note for a portion of the semester residence-hall rent and semester-plan board fee. Amounts up to $200 for room rent and $200 for board fee may be included in the note. In such cases, a note for the first semester charges will be due October 1, and a note for the second semester charges will be due March 1.

A $75 advance payment of room rent is required for a room reservation for the fall semester. Currently enrolled students who expect to continue enrollment are given an opportunity to make room reservations and pay the $75 during the spring semester at a time designated by the Housing Office. New students who desire residence hall accommodations are to pay the $75 advance payment of room rent and the $80 admissions deposit when they accept the University's offer of admission. The $75 advance payment of room rent and the $80 admissions deposit are deducted from the amount otherwise due for the first semester expenses.

All checks and money orders should be made payable to Clemson University. A personal check given in payment of University expenses which is returned unpaid by the bank immediately creates an indebtedness to the University.

SCHEDULE OF SEMESTER CHARGES 1983-84

Actual charges are not known when the catalog is printed; consequently these tentative estimates are subject to change as conditions warrant.

	Full-Time S.C. Resident	*Full-Time Nonresident*
Tuition	$ 25.00	$ 100.00
Matriculation Fee (nonrefundable)	5.00	5.00
University Fee	616.00	1,380.00
Medical Fee	55.00	55.00
Semester Total (Excluding Room and Board)	$701.00	$1,540.00

Residence Halls

Johnstone (Sections A-F)	$455.00
Benet, Bowen, Bradley, Cope, Donaldson, Geer, Johnstone (Annexes A, F), Norris, Sanders, Wannamaker, Young	$470.00
Barnett, Byrnes, Lever, Manning, Mauldin, Smith	$500.00
Clemson House	
Room (two occupants)	$510.00
Apartment with kitchenette (three or four occupants)	$535.00
Thornhill Village (four occupants)	$615.00
Calhoun Courts Apartments (four occupants), Village Green	$650.00

Board

Five-Day Plan (Monday through Friday)	$425.00
Seven-Day Plan (Monday through Sunday)	$495.00

Part-time Student Undergraduate students taking less than 12 semester credit hours will be charged each semester according to the following schedule. These fees do not provide for admission to athletic events, concert series, and other such activities.

	S.C. Resident	*Nonresident*
Matriculation Fee (nonrefundable)	$ 5.00	$ 5.00
Tuition (per semester hour)	$ 2.00	$ 8.00
University Fee (per semester hour)	$50.00	$110.00

Auditing Charges for auditing are made each semester according to the following schedule:

Tuition (per semester hour)	$ 1.00	$4.00
University Fee (per semester hour)	$25.00	$55.00

Past Due Accounts Any indebtedness to the University which becomes past due immediately jeopardizes the student's enrollment, and no such student will be permitted to reenroll for an ensuing semester or summer school term. Further, any student who fails to pay all indebtedness to the University may not be issued a transcript or diploma.

Refund of Academic Fees for Students Enrolled for Less than a Full Semester No adjustments in charges will be made on a semester's tuition and fees after five weeks from the date classes begin for the semester. Charges for periods of attendance of five weeks or less during a semester shall be made on the following basis:

Two weeks or less	20%
More than 2 but not more than 3 weeks	40%
More than 3 but not more than 4 weeks	60%
More than 4 but not more than 5 weeks	80%
More than 5 weeks	100%

Refund of Dining Hall and Residence Hall Fees Specific information relating to living-expense refunds is given in the sections on Housing and Student Food Service.

Late Registration Service Charge Registration for classes is scheduled for specific days, and certain definite procedures are outlined to prevent or reduce the problems incident to late registration. A student has not completed registration until all required steps have been taken, the final being the return of the registration form, and if not preregistered for classes the properly signed class registration card to the Office of Admissions and Registration. Any student failing to complete registration on the specified class registration days will incur a service charge of $10.

Books and Supplies The cost of books is not included in the Schedule of Semester Charges. Books and supplies at the beginning of the semester will be approximately $125-$200.

Transcripts Requests for transcripts should be directed to the Office of Admissions and Registration. The initial transcript is issued gratis. Thereafter, a minimum fee of $3 is charged for a single copy. A charge of 50 cents will be made for each additional copy on the same order.

RESIDENT TUITION AND FEES

Proof— Any student or prospective student whose status concerning entitlement to payment of in-state tuition and fees is questionable has the responsibility of securing a ruling from the University by providing on special forms all relevant information. These forms can be obtained from the office of the Dean of Admissions and Registration and are to be completed and returned to that office at least two weeks prior to registration for any semester for which the student desires to pay the in-state rate.

Entitlement— Eligibility or payment of in-state tuition and fees shall be determined under the provisions of Section 59-101-70, South Carolina Code of Laws, 1976, as amended (Act No. 466). This law is set forth in its entirety as follows (subject to further amendment by the General Assembly).

Definitions— Section 1. As used in this act:

A. The words "State Institution" shall mean those post-secondary educational institutions under the jurisdiction of the following: (1) Board

of Trustees, Clemson University; (2) Board of Trustees, Medical University of South Carolina; (3) Board of Trustees, South Carolina State College; (4) State College Board of Trustees; (5) Board of Visitors, The Citadel; (6) Board of Trustees, University of South Carolina; (7) Board of Trustees, Winthrop College; and (8) State Board of Technical and Comprehensive Education.

B. The word "student" shall mean any person enrolled for studies in any State institution.

C. The word "residence" or "reside" shall mean continuous and permanent physical presence within this State, *provided,* that temporary absences for short periods of time shall not affect the establishment of a residence.

D. The word "domicile" shall mean a person's true, fixed, principal residence and place of habitation; it shall indicate the place where such person intends to remain, and to which such person expects to return upon leaving without establishing a new domicile in another state. For purposes of this section one may have only one legal domicile; one is presumed to abandon automatically an old domicile upon establishing a new one. Housing provided on an academic session basis for students at State Institutions shall be presumed not to be a place of principal residence, as residency in such housing is by nature temporary.

E. The words "in-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are domiciled in South Carolina in accordance with this act; the words "out-of-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are not domiciled in South Carolina in accordance with this act.

F. The words "independent person" shall mean a person in his majority, or an emancipated minor, whose predominant source of income is his own earnings or income from employment, investments, or payments from trusts, grants, scholarships, loan, or payments of alimony or separate maintenance made pursuant to court order.

G. The words "dependent" or "dependent person" shall mean one whose financial support is provided not through his own earnings or entitlements, but whose predominant source of income or support is payments from a parent, spouse, or guardian and who qualifies as a dependent on the federal tax return of the parent, spouse or guardian; *provided,* however, that the words "dependent" or "dependent person" shall not include a person who is the recipient of alimony or separate maintenance payments pursuant to court order.

H. The word "minor" shall mean a person who has not attained the age of eighteen years; and the words "emancipated minor" shall mean a minor whose parents have entirely surrendered the right to the care, custody and earnings of such minor and are no longer under any legal obligation to support or maintain such minor.

I. The word "parent" shall mean a person's natural or adoptive father or mother; or if one parent has custody of the child, the parent having custody; or if there is a guardian or other legal custodian of such person,

then such guardian or legal custodian; *provided,* however, that where circumstances indicate that such guardianship or custodianship was created primarily for the purpose of conferring South Carolina domicile for tuition and fee purposes on such child or dependent person, it shall not be given such effect.

J. The word "spouse" shall mean the husband or wife of a married person.

Tuition and Fees for Residents of State—Section 2. South Carolina domicile for tuition and fee purposes shall be established as follows in determinations of rates of tuition and fees to be paid by students entering or attending State Institutions:

A. Independent persons who reside in and have been domiciled in South Carolina for a period of no less than twelve months with an intention of making a permanent home herein, and their dependents, may be considered eligible for in-state rates.

B. Independent persons who reside in and have been domiciled in South Carolina for fewer than twelve months but who have full-time employment in the State, and their dependents, may be considered eligible for in-state rates for as long as such independent person is employed on a full-time basis in the State.

C. Where an independent person meeting the provisions of Section 2 B above, is living apart from his spouse, or where such person and his spouse are separated or divorced, the spouse and dependents of such independent person shall have domiciliary status for tuition and fee purposes only under the following circumstances:

(1) if the spouse requesting domiciliary status for tuition and fee purposes remains domiciled in South Carolina although living apart or separated from his or her employed spouse.

(2) if the dependent requesting domiciliary status for tuition and fee purposes is under the legal custody or guardianship, as defined in Section 1 I above, of an independent person who is domiciled in this State; or if such dependent is claimed as an income tax exemption by the parent not having legal custody but paying child-support, so long as either parent remains domiciled in South Carolina.

D. The residence and domicile of a dependent minor shall be presumed to be that of the parent of such dependent minor.

When Residency Changes—Section 3. When the domicile of a student or of the person upon whom a student is financially dependent changes after enrollment at a State Institution, tuition charges shall be adjusted as follows:

A. Except as provided in Section 2 B above, when domicile is taken in South Carolina, a student shall not become eligible for in-state rates until the beginning of the next academic session after expiration of twelve months from date of domicile in this State.

B. When South Carolina domicile is lost, eligibility for in-state rates shall end on the last day of the academic session in which the loss occurs; however, application of this subsection shall be at the discretion of the institution involved.

C. Notwithstanding the other provisions of this section, any dependent person who has been domiciled with his family in South Carolina for a period of not less than three years immediately prior to his enrollment may enroll in a state-supported institution of higher learning at the in-state rate and may continue to be enrolled at such rate even if the parent, spouse, or guardian upon whom he is dependent moves his domicile from this State.

Effect of Marriage— Section 4. Except as provided in Section 2 above, marriage shall affect determinations of domicile for tuition and fee purposes only insofar as it operates to evince an intention by the parties to make a permanent home in South Carolina.

Military Personnel and Their Dependents— Section 5. Notwithstanding other provisions of this act, during the period of their assignment to duty in South Carolina members of the armed services of the United States stationed in South Carolina and their dependents may be considered eligible for in-state rates. When such armed service personnel are ordered away from the State, their dependents may continue for an additional twelve months to have this eligibility at the State Institutions where they are enrolled at the time such assignment ends. Such persons and their dependents may be considered eligible for in-state rates for a period of twelve months after their discharge from the armed services even though they were not enrolled at a State Institution at the time of their discharge, if they have evinced an intent to establish domicile in South Carolina and if they have resided in South Carolina for a period of at least twelve months immediately preceding their discharge.

Exceptions— Section 6. Full-time faculty and administrative employees of State Institutions, and the spouses and children of such persons, shall be excluded from the provision of this act.

Rates May Be Abated for Nonresidents on Scholarship— Section 7. Notwithstanding other provisions of this act, the governing boards listed in Section 1 A above, are authorized to adopt policies for the abatement of any part or all of the out-of-state rates for students who are recipients of scholarship aid.

Administration of Act— Duties of Students— Section 8. Each State Institution shall designate an official to administer the provisions of this act. Students making application to pay tuition and fees at in-state rates shall have the burden of proving to the satisfaction of the aforesaid officials of State Institutions that they have fulfilled the requirements of this act before they shall be permitted to pay tuition and fees at such rate.

Penalties for Willful Misrepresentations— Section 9. Where it appears to the satisfaction of officials charged with administration of these provisions that a person has gained domiciliary status improperly by making or presenting willful misrepresentations of fact, such persons shall be charged tuition and fees past due and unpaid at the out-of-state rate, plus interest at a rate of eight percent per annum, plus a penalty amounting to twenty-five percent of the out-of-state rate for one se-

mester; and until these charges have been paid no such student shall be allowed to receive transcripts or graduate from any State Institution.

Regulations—Section 10.* The Commission on Higher Education may prescribe uniform regulations for application of the provisions of this act and may provide for annual review of such regulations.

EDUCATIONAL BENEFITS FOR VETERANS AND WAR ORPHANS

The Veterans Administration provides educational assistance for veterans and children of deceased or totally disabled veterans who meet requirements of applicable laws and regulations. Any veteran or child of a deceased or totally disabled veteran should communicate with the nearest Veterans Administration Office to determine whether or not he is entitled to any educational benefits.

CLEMSON UNIVERSITY FOUNDATION

The Clemson University Foundation, comprised of twenty-four directors, is an incorporated, tax-exempt foundation organized exclusively to help the educational programs of Clemson University. The Executive Director of Development serves as Executive Director of the Clemson University Foundation. The President of Clemson University is an Ex Officio Director.

There are five committees in the Foundation that oversee its activities and operations: Capital Campaign, Deferred Gifts, Corporate and Foundations, Investment, and Executive. In addition, there are five committees representing colleges of the University. The purpose of these committees is to utilize the resources of the Clemson University Foundation to locate and solicit endowment funds for their colleges. The colleges currently represented are Agricultural Sciences, Commerce and Industry, Engineering, Forest and Recreation Resources, and Liberal Arts.

As of December 1982, the total assets of the Clemson University Foundation, including permanent endowment, exceeded $10 million.

ALUMNI RELATIONS AND RESOURCES DEVELOPMENT

The Clemson Alumni Association has been recognized on numerous occasions as one of the top such organizations in the country. The Alumni Loyalty Fund consistently achieves high participation in its annual fund program, and in 1980 was cited as best among its peers in sustained performance. Participation in the annual fund has ranked at or near twice the national average for the past twenty years, and some $11 million has been directed toward enrichment of the University's academic programs.

In developing resources for the University, this division sets a high priority on unrestricted annual support, not only from alumni, but from parents, friends, faculty, and staff. At the same time, however, the director of deferred giving and estate planning devotes a major portion of his time and effort to planning extended term giving and advising in-

*Regulations may be obtained from the Office of Admissions and Registration.

dividuals of the opportunity to use tax laws in developing structured deferred giving that benefits both the donor and the University.

All functions and services of the National Clemson Alumni Association are coordinated from this office. Accurate records of address, employment, and biographical information are kept on alumni of the institution, as well as on other former students who express a desire to be involved with the University and its alumni program.

A regular publications program keeps alumni and friends aware of what Clemson University is doing through its programs in teaching, research and public service. The Clemson World magazine is published quarterly and is supplemented each spring with a complete report of private support that details how Clemson uses private dollars to enhance academic programs that otherwise might not exist.

The overriding mission of this division is to strengthen the University by developing new resources to support the educational programs at a time when such private support is more critical to Clemson than ever before.

RESERVE OFFICERS TRAINING CORPS

The Departments of the Army and the Air Force both maintain ROTC units at Clemson University. Their mission is to produce officers of high quality to pursue both technical and nontechnical careers in the U.S. Army and Air Force. Both four- and two-year programs are available. The four-year program consists of the basic course for freshmen and sophomores and the advanced course for juniors and seniors. There is a $25 refundable uniform deposit.

Scholarships are available to selected ROTC students. Each scholarship pays for tuition, books, and laboratory expenses, in addition to $100 per month during the school year. Nonscholarship advanced cadets also receive $100 per month. Basic course credit may be awarded to students having one or more years of military service.

Selected advanced Air Force cadets receive flight training at government expense. Orientation flights are available for all cadets.

Cadets who complete the Advanced or Professional Course are appointed Second Lieutenants. Ample opportunity exists for graduate study in both services, with temporary deferments possible.

HISTORY

It was the fall of the year and likely one of those blustery days as the horse-drawn carriage slowly rolled to a stop on a Pendleton road in 1886.

The driver, a tall, distinguished-looking man in his late 70's peered from the carriage as if looking for someone he knew. Soon, another man approached the carriage, exchanged greetings with the first, and the two men—Thomas Green Clemson and Benjamin Ryan Tillman—drove away together toward historic Fort Hill, a plantation some four miles away and the former homestead of John C. Calhoun, Clemson's late father-in-law.

Mr. Clemson had invited Senator Tillman to his home to discuss their mutual conviction that South Carolina needed a separate college devoted to industrial and scientific education. At Fort Hill, they met with Colonels D. K. Norris and R. W. Simpson. There the four "spent nearly the whole day in talking over the new project which Mr. Clemson had in mind and which he unfolded to us," Tillman later wrote.

Perhaps the most significant result of this conference was Mr. Clemson's decision to change a will he had made three years earlier and to execute a new will so as to serve better the great purpose which he had had in mind for many years.

Although his will of 1883 sought to provide for establishment of a scientific institution upon the Fort Hill place, Mr. Clemson later decided that his intention and purpose as stated in that will might be misunderstood.

In his new will, executed November 6, 1886, Mr. Clemson wrote that he desired to make his purpose plain and to make some other changes in the disposition of his property. He clearly explained the nature and purpose of his proposed institution, the establishment of which "is now the one great desire of my life."

"It should afford thorough instruction in agriculture and the natural sciences connected therewith; it should combine, if practicable, physical and intellectual education, and should be a high seminary of learning in which the graduate of the common schools can commence, pursue and finish the course of studies terminating in thorough, theoretic and practical instruction . . ."

The first item of the new will concerned disposition of the 814 acres of the Fort Hill place and was largely taken from the 1883 will.

The will gave to the State all that part of the Fort Hill Estate inherited by Mrs. Clemson (the former Anna Maria Calhoun who died in 1875, thirteen years before her husband) from her mother and the bulk of Mr. Clemson's other real and personal property. The latter amounted to a sum which, considering the purchasing power at the time, probably has been only a few times exceeded in a public benefaction in South Carolina.

Mr. Clemson's will also provided for a seven-member Board of Trustees that would govern and manage the new institution. Named were Colonels Simpson and Norris, M. L. Donaldson, R. E. Bowen, B. R. Tillman, J. E. Wannamaker, and J. E. Bradley who with those chosen by the General Assembly would constitute a governing board if the State accepted the bequest; but, who, in the event the State declined the bequest, would alone constitute a governing board for a private institution.

These seven trustees, along with other friends of the movement and the agricultural groups in the State, developed and organized a public opinion favorable to the plan.

In November 1889, the South Carolina General Assembly accepted the terms of Mr. Clemson's will and following the decision of the U.S. Supreme Court to uphold the will, the State of South Carolina and the

full Board of Trustees proceeded to convert the dream of Thomas G. Clemson into the reality of Clemson College.

The institution formally opened in July 1893, with an enrollment of 446 students. The first graduating exercises were held in December 1896, with a graduating class of 37—15 in the agricultural courses and 22 in engineering courses.

The college was also established under the Morrill Land-Grant Act passed by the National Congress in 1862. Clemson University, therefore, is a member of the national system of Land-Grant Colleges and Universities.

In 1964, in recognition of expanded offerings of the institution not only in the areas of agricultural and mechanical arts but also in the sciences and arts, the name of the institution was changed to Clemson University. This change by the legislature, effective July 1, 1964, followed a recommendation to that body by the Board of Trustees.

LOCATION

The University is located on the Fort Hill homestead of John C. Calhoun, in the foothills of the Blue Ridge Mountains. It has an elevation of 800 feet above sea level and commands an excellent view of the mountains to the north and west, some of which attain an altitude of over 5000 feet.

The University is located at Clemson, South Carolina, on the main line of the Southern Railway. U.S. Highways numbers 76 and 123 pass through Clemson.

BUILDINGS AND GROUNDS

Campus architecture is a pleasing blend of the old and new complemented by a beautiful landscape of abundant trees, grassy expanses, and flowering plants and shrubs.

The campus proper consists of 1,400 acres. The academic buildings, student housing, service facilities and equipment are valued at $168 million. Basically the campus is the site of Thomas Green Clemson's plantation, willed to South Carolina in 1888 for the establishment of the University. Fort Hill, former home of both Mr. Clemson and his father-in-law, John C. Calhoun, has been preserved at the center of the campus as a national shrine.

Challenges of the present—developing alternate energy sources and better conservation technology, improving agricultural production along with technology transfer, and improved health-care delivery—are symbolized by such buildings as the multipurpose center for the College of Nursing. Clemson's long, rich tradition of education, scientific research, and public service is brought to mind by historic structures like Tillman Hall and its clock tower, focal point of the campus, whose cornerstone was laid in 1891.

Beyond the main campus, stretching into Oconee, Pickens, and Anderson counties are another 24,000 acres of farm and agricultural and forestry research lands. Throughout the State are 8,300 more acres devoted to Agricultural Experiment Station research and 4-H Club activities.

One of the central features of campus development is the Robert Muldrow Cooper Library with its large reflection pool. This beautiful structure houses some 859,461 volumes, 118,584 equivalent volumes on microforms and other materials.

Facilities completed during the latter sixties and early seventies include three high-rise residence halls which house 1,296 students, a low-rise dormitory, a 34-bed hospital and out-patient clinic, and East Campus cafeteria, an arts and sciences classroom building and 10-story faculty office tower, and the multipurpose J. C. Littlejohn Coliseum which seats 11,000 people for basketball games and 12,000 for speaking engagements, concerts and other functions.

Teaching and laboratory facilities of the College of Agricultural Sciences are housed in the R. F. Poole Agricultural Center complex. Another grouping serves the College of Engineering, including Olin Hall for ceramic engineering and Earle Hall for chemical engineering. These two buildings and their excellent equipment represent gifts from the Olin Foundation totaling nearly $2 million.

Renovation of Sirrine Hall, home of the College of Commerce and Industry was completed in the fall of 1981.

The College of Architecture is located in the modern, well-equipped Lee Hall. Other groupings of classrooms and laboratories serve the College of Education, College of Liberal Arts, and College of Sciences.

Historic Tillman Hall was recently renovated to meet fire, safety, and handicapped regulations and to provide modern laboratory and office facilities for the College of Education. Efforts were made to avoid alteration of the exterior appearance of this venerable landmark.

Recent major additions to the campus include Jordan Hall for biological sciences and a multipurpose center for the College of Nursing. Complete renovation and expansion of McAdams Hall agricultural engineering building was completed in 1976.

A complex for the College of Forest and Recreation Resources and College of Agricultural Sciences administration was completed in 1975.

Other facilities include Jervey Athletic Center, and expansion of Lee Hall which houses the College of Architecture, Clemson University Union and related facilities, and additions and renovations at Fike Recreation Center, including a natatorium with a standard Amateur Athletic Union size swimming pool with tartan deck and a diving tank.

University housing consisting of residence halls and apartment units will accommodate 6,800 single students. Apartments are available for 150 married couples.

LIBRARIES

Current resources and facilities of Clemson's libraries make Clemson one of the most important research institutions in the Southeast. Today, the libraries have a collection of nearly one million volumes. Outstanding collections of journals, books, and primary research materials have been developed in many areas, especially agriculture, natural and physical sciences, economics, and technology. In the social sciences, particularly strong manuscript collections have been developed around the papers of Vice President John C. Calhoun, South Carolina Governor James F. Byrnes, and Senator Edgar A. Brown. These and other resources are drawn on by scholars from all over the United States, Japan, and Europe. The library recently acquired the papers of South Carolina Senator Strom Thurmond; these soon will be made available for research.

Extensive use of the collection is made by borrowers from many parts of the Southeast through modern, efficient techniques. The Cooper Library is linked by computer terminals to more than 1,500 other libraries through OCLC, Inc. for cataloging and inter-library loan services. Online bibliographic retrieval is available through the powerful data-base searching capabilities of Lockheed and SDC search services. A remote center with terminals accessing the Clemson mainframe computer is available in the library.

In addition to the Robert M. Cooper Library, the University Libraries consist of the Emery A. Gunnin Architectural Library in Lee Hall, the Sirrine Library (textiles and business) in Sirrine Hall, and departmental libraries in Chemistry and Physics.

Except for adjustments in scheduling during holiday periods, Cooper Library is open Monday—Thursday, 7:45 a.m.-1:00 p.m.; Friday, 7:45 a.m.-11:00 p.m.; Saturday, 8:00 a.m.-6:00 p.m.; and Sunday, 1:00 p.m.-1:00 a.m.

Library policy requires that all students must present validated I.D. cards to check out library materials. New students are encouraged to visit with staff at the reference desk at any time to receive assistance with learning about the Library and to ask questions about collections, services, and policies.

STUDENT SERVICES

HOUSING

Single Student Housing University housing consisting of residence halls and apartment units will accommodate 6,800 single students. Rooms in residence halls are double occupancy, and the two-bedroom apartments will each accommodate four students. All single-student housing is air conditioned and furnished in a manner that meets the needs of today's college student. Upon returning a University Housing Application/Waiting List Card which is included in their application from the Admissions Office, new students are provided complete housing in-

formation. Graduate students and former students should write to the Housing Office for these materials. Refunds will be made in accordance with the housing contract.

Married Student Housing Clemson provides 150 apartments for married students. One hundred of these formerly served as faculty and staff housing and are located on the campus. The other 50 are located approximately one mile from the campus. Graduate students are given priority of assignment to married student housing. Brochures and application forms may be obtained by writing to the Housing Office, Mell Hall, Clemson University, Clemson, South Carolina 29631.

FOOD SERVICE

The University offers two economical board plans and also provides meals on a cash basis in two student dining halls with unlimited seconds on all items with the exception of some entree selections. Students may also eat in the Clemson House dining room and pay cash for individual meals. Boarding students may use their meal cards at the Clemson House for a cash equivalency or select a predesigned meal at no additional cost.

Five-Day Board Plan (15 meals), Monday through Friday—holidays excluded, $425 per semester.

Seven-Day Board Plan (21 meals), Monday through Sunday—holidays excluded, $495 per semester.

Both meal plans begin immediately after the student obtains a meal card at the beginning of a semester and end after the evening meal on the day of graduation. The meal card is personal and may not be loaned, transferred, or sold to another person.

Students who are entering the University for the first time from high school or preparatory school and who live in University housing, excluding Calhoun Courts, Clemson House, Thornhill Village, and Village Green Apartments, are required to subscribe to one of the two meal plans for their first semester. All other students have the option of selecting a meal plan on a semester basis or paying cash for individual meals at prevailing prices. Students may not discontinue a meal plan during a semester as long as they remain enrolled, except in the case of marriage or circumstances which are determined by the University to be beyond the student's control.

All students may change from the Five- to the Seven-Day Board Plan at any time during the academic year by paying the added cost. Those desiring to change from the Seven- to the Five-Day Board Plan may do so only at the semester-payment period. Refunds, when authorized, will be made on a pro rata basis.

HEALTH SERVICE

Student Health Service: Cost per Semester $55. Payment of the Student Health Service fee is required of all students living in University residence halls and all full-time students even though they do not reside in University housing.

The Student Health Service is housed in the Redfern Health Center and is complete with outpatient department and a 24-bed hospital. A full-time staff consists of four physicians, including the director, a part-time psychologist, fifteen registered nurses, one registered X-ray technician, two registered laboratory technicians, and a registered pharmacist. In addition, a sufficient number of nurses' aides, secretarial workers, orderlies and maids for 24-hour-a-day operation are employed. The best of modern equipment is available for student use. Regular office hours are maintained, plus the services of the nursing staff for minor ailments after hours. One physician is on call at night for emergencies whenever the school is open. *The Health Service is closed between semesters.*

The Student Health Service at Clemson University has several important functions. All of these are aimed at keeping the student in good health so that he may effectively pursue his school work. There is, of course, the basic function of medical care for the ill and injured. This is a vital part of its work. In addition to this, the Student Health Service attempts to put strong emphasis on health rather than illness. This begins with the entrance medical form. In laying out this form an attempt is made to get information, examinations, and preventive medical procedures carried out to better equip the staff in protecting the student from illness and to serve as a guide for the care of preexisting medical problems.

As the student progresses through his academic experiences, other procedures may be required or highly recommended. These are primarily an effort to teach the individual self-responsibility for maintenance of his own health, protection of the health of those around him, and location of possible hidden diseases. The Health Service also has the position as the source of medical information as well as responsibility for indicated medical action: diagnostic, therapeutic, and preventive.

The medical fee paid by each student covers the services of the University physicians, the Health Service staff, and equipment for most illnesses and injuries occurring on or around the campus. This coverage is given under conditions similar to that of one's own physician.

The fee does not cover routine physical examinations for employment or transfer to another school, fees for outside physicians when called in for consultation, medical or surgical services performed away from the University, or for accidents occurring off the campus.

A complete pharmacy is maintained and dispenses medication to students as prescribed by the staff physicians on a cost-plus service basis. Students are encouraged to pay for medications when received. When this is not possible, the Health Service will bill the student. A $5 service charge is added when billing is necessary.

Clemson University maintains a licensed emergency medical service which includes a modern modular ambulance and sufficient certified emergency medical technicians for 24-hour-a-day service. All medical emergencies on campus will be handled by the unit. In addition, transportation for serious illnesses or emergencies requiring special care will

be provided by the unit at no cost. Expenses for nonemergency transportation, however, are to be paid for by the student.

MEDICAL QUESTIONNAIRE

Completion of a medical history questionnaire is required of all new students entering Clemson University for the first time. This is to be completed by the student and mailed directly to Redfern Health Center, Clemson University, Clemson, South Carolina 29631. Some help may be needed from parents or family physician concerning necessary details about early childhood illnesses and immunizations.

It is highly recommended that students have a current tetanus toxoid series or booster within ten years and immunization against poliomyelitis, diptheria, measles, and mumps.

ACCIDENT AND SICKNESS INSURANCE

An accident and sickness insurance plan is available to all full- and part-time students and their dependents. Information concerning the insurance program is sent to students and parents with the fall semester prepayment material. Additional information may be obtained from the Office of Vice President for Student Affairs. This insurance is designed to cover major medical expenses not covered by the Health Service.

UNDERGRADUATE FINANCIAL AID

The Student Financial Aid Office administers and/or coordinates various types of undergraduate financial aid administered by Clemson University, which includes scholarships, loans, grants, and part-time employment. The office works jointly with the Financial Aid Committee and the Scholarships and Awards Committee.

Beginning in December each year, application may be made to the Financial Aid Office for financial assistance for the next academic year. Financial aid requests, based on need, should be supported by a Financial Aid Form, which is filed directly with the College Scholarship Services and renewed annually.

COUNSELING SERVICES

The goal of the Counseling and Career Planning Center is to aid students in their personal development and academic life. Students who would like help with adjusting to academics at Clemson, resolving personal/social concerns, and making career plans are encouraged to stop by. Also welcome are students who would like to improve the way they cope with the many decisions and pressures college students must face.

Additional counseling services sponsored for students are groups and workshops on self-improvement such as weight-control, study skills, stress reduction, assertive training, and others. A Self-help Library and an extensive Career Planning Resource Library are operated by the Center. A speaker service is maintained for groups, clubs, and classes who would like more information on self-improvement. In addition, the Center manages the National Testing Program on campus. Applications

for tests such as the SAT, GRE, GMAT, LSAT, and others are available at the Center.

The Center is staffed by a team of four professionals. All sessions are confidential and free of charge to Clemson University students. Appointments may be made by calling 656-2451 or stopping by the office on South Palmetto Boulevard.

CAREER SERVICES

Career planning and development opportunities are available to students who desire information and assistance concerning their involvement with the world of work. These services are provided by the Office of Cooperative Education and the Office of Placement, located on the eighth level of the Clemson University Union.

Cooperative Education Program The Cooperative Education Program is a planned program in which students at the University combine alternate periods of academic study and periods of related work with a participating business, industry, agency, or organization. The work periods normally take place during the sophomore and junior years (including summers), while the freshman and senior years are spent in full-time study.

Students qualify for participation in the Cooperative Education Program by satisfactory completion of thirty semester hours of academic work. Transfer students may qualify in one semester. Three, four, or five co-op work periods are projected and included in each student referral. Usually two students from the same academic area are paired to fill a full-time work position with a participating employer. While one student is at work the other is enrolled in classroom study at the University.

Students enrolled in the Cooperative Education program pay a registration fee of $15 each semester or summer session which coincides with their work period. That fee enables students to maintain student status and participate in student activities and services that are normally associated with being enrolled at the University. However, the fee does not cover the cost of tuition for academic courses, health service, or any of the other benefits normally associated with the standard University fee. In responding to insurance, tax, and other questionnaires regarding student status, the University considers students on work assignment to be continuing students in the same sense that traditional students are continuing students during the summer months, between the spring and fall semester.

The Cooperative Education Program is offered to students enrolled in academic departments or programs in the Colleges of Agricultural Sciences, Architecture, Commerce and Industry, Education, Engineering, Forest and Recreation Resources, Liberal Arts, and Sciences.

Placement Service The University Placement Office provides assistance to students who seek permanent employment or summer work. The Office does not place candidates but assists them by providing counseling and seminars on career planning, job search, resume prepa-

ration, and interview techniques. Students are also encouraged to utilize the Placement Library consisting of reference books, video tapes, and literature provided by companies and agencies.

The Placement Office coordinates and plans campus interview visits with representatives from business, industry, and government agencies. These interviews are scheduled in the fall and spring semesters for qualified seniors or graduate students who are registered with the Placement Office.

Alumni seeking employment are encouraged to utilize the services of the Placement Office for counseling and guidance in their job search and to be added to the mailing list and receive the *Placement Bulletin* which lists career opportunities.

TAPS

SCHOLASTIC REGULATIONS

Proper discharge of all duties is required at Clemson University, and a student's first duty is his scholastic work. All students should be thoroughly acquainted with and cognizant of these basic requirements.

Credit System The semester hour is the basis of all credits. Generally, one recitation hour or three laboratory or shop hours a week for a semester constitute a semester hour. Thus, in ENGL 101, Composition I, 3(3,0), as you will find this subject listed in the Degrees and Curricula, the student takes three semester hours. When he completes this course satisfactorily, he is granted three semester credit hours on his record. The notation "3(3,0)" means that the course carries three credits, has three clock hours of theory or recitation per week, and no laboratory hours. CH 101, General Chemistry, 4(3,3), carries four semester hours, has three hours of theory, and a three-hour laboratory period.

Grading System The grading system is as follows:

A—*Excellent* Indicates that the student is doing work of a very high character, the highest grade given.

B—*Good* Indicates work that is definitely above average, though not of the highest quality.

C—*Fair* Indicates work of average or medium character.

D—*Pass* Indicates work below average and unsatisfactory, the lowest passing grade.

F—*Failed* Indicates that a student knows so little of the subject that it must be repeated in order that credit may be received.

I—*Incomplete* Indicates that a relatively small part of the semester's work remains undone. Grade I is not given a student who made a grade F on his daily work. Students are allowed thirty days after the beginning of the next scheduled session, excluding summers and regardless of the student's enrollment status, to remove the incomplete grade. Normally, only one extension for each I may be granted, and this under unusual circumstances. The extension must be approved in writing by the instructor of the course and the head of the department in which the course was taken. The extension will indicate the nature and amount of work to be completed and the time limit. (Students under this policy are prohibited from removing the I by repeating the course.) A letter grade of I coverts to F unless the incomplete is removed within the time specified.

W—*Withdrew* This grade indicates that the student withdrew from the course or was withdrawn by the instructor after the first four weeks of classwork and prior to the last five weeks of classes, not including the

examination period. Each undergraduate student is allowed to withdraw or be withdrawn with a grade of W from no more than 14 hours of coursework during the entire academic career at Clemson University. Transfer students may withdraw from no more than 10 percent of the total work remaining to be done in the chosen undergraduate curriculum at the time of transfer to Clemson University up to a total of 14 hours of coursework, whichever is fewer. Partial credit for courses cannot be dropped. A student who exceeds these limits of hours or who is enrolled during any part of the last five weeks of classes shall have final grades recorded. These restrictions apply to withdrawal from the University as well. Any variance from these restrictions must be approved by the Provost or the Provost's designee.

Pass-Fail Option Juniors or Seniors enrolled in a four-year curriculum may take four courses (maximum of 15 credit hours), with not more than two courses in a given semester on a pass-fail basis. Transfer and five-year program students may take pass-fail courses on a pro rata basis.

Required courses or courses that are needed to fulfill departmental requirements may not be taken pass-fail.*

Letter-graded courses which have been failed may not be repeated pass-fail.

Honors Program may exercise an option as to acceptance of pass-fail grading for Honors courses.

Registration in pass-fail courses will be handled in the same manner as for regular enrollment. Departmental approval must be obtained via approval form and returned to the Office of Admissions and Registration in accordance with the University Calendar for adding courses.

Instructors will submit letter grades to the Office of Admissions and Registration. These grades will then be converted as follows: A, B, C to P (pass); D, F to F (fail). Only P (minimum letter grade of C) or F will be shown on a student's permanent record and will not affect the grade-point ratio.

If a student changes to a major which requires a previously passed course, and this course has been taken pass-fail, he may request either to take the course on a letter-graded basis, the P be changed to C, or substitution of another course.

In the event limited enrollment in a class is necessary, priority will be given as follows: majors, letter-graded students, pass-fail students, and auditors.

Final Examinations The standing of a student in his work at the end of a semester is based upon daily classwork, tests or other work, and the final examinations. Faculty members may excuse from the final examinations all students having the grade of A on the work of the course prior to the final examination, but for all other students written examinations are required in all subjects at the end of each semester, except in certain laboratory or practical courses in which final examinations are not deemed necessary by the department faculty.

*Exception — RPA 206, 207, and 405 are offered on a Pass-Fail basis only

Final examinations must be given on the dates and at the times designated in the final examination schedule.

Grade Reports Scholastic reports are mailed to students four times each year, including a preliminary statement of progress near the middle of each semester and a final report at the end of each semester.

Dropping Classwork A subject dropped after the first four weeks of classwork and prior to the last five weeks is recorded as W—Withdrew.

Removal of Failures A student who has failed (made a grade F) in a subject cannot receive credit for that subject until it has been satisfactorily repeated hour for hour in class, except that in the case of correlated laboratory work, the number of hours to be taken shall be determined by the instructor. Where separate grades for class and laboratory work are given, that part of the subject shall be repeated in which the failure occurs.

Rescheduling Courses Failed A student who wishes to reschedule a course he has failed must do so within his next year of residence, or if the course is not offered during this year of residence, he must reschedule the course the first time it is offered thereafter during his attendance at Clemson.

Rescheduling Courses Passed A student may repeat a course he has passed with a grade lower than B provided he does so within three semesters of residence after the completion of his original enrollment in the course.

Advanced Placement and Credit by Examination In addition to earning credit by the usual method involving classroom attendance, a student may receive credit toward his degree by completing a course successfully by examination only.

Freshmen interested in exempting some of the elementary courses in this manner should participate in the College Board Advanced Placement Examination program and have the results of these tests sent to Clemson.

Certain departments will also grant credit for successful completion of College-Level-Examination Program (CLEP) subject examinations which are administered by the College Board.

Credit may be earned by enrolled students by means of a special examination without the necessity of class attendance subject to the following requirements:

1. The applicant must present evidence which would indicate that he has received training or taken work which is approximately equivalent to that given in the course at Clemson for which an examination is requested and that an examination is warranted.
2. The applicant must not have previously failed or audited the course at Clemson.
3. The applicant must apply in writing for the examination and the request must be approved by the instructor, head of the department in which the course is taught, dean of the college in which the course is

taught, and the Dean of Admissions and Registration. Application forms are available in the Office of Admissions and Registration.

4. Credit (CR) will be awarded for acceptable work in lieu of letter grades in recognition of college-level achievement as determined by College Board Advanced Placement Examination, College-Level-Examination Program subject examination, institutional special examinations, and similar instruments.

Work Taken at Another Institution Clemson students may receive credit for work taken at another institution; however approval of the work should be obtained by the student prior to scheduling the work. Information and forms relative to this approval may be obtained in the Office of Admissions and Registration. By obtaining advance approval, the student is assured of receiving proper credit at Clemson provided he passes the work with a grade of C or higher.

No course taken at a nonbaccalaureate-degree institution may be used as an equivalent or substitute for any 300- or 400-level Clemson course.

Classification All new students are classified as freshmen unless they have attended another college prior to entrance. Students who have completed college work elsewhere will be classified on the basis of semester hours accepted at Clemson rather than the amount of work presented. In order to be classified as a member of any class other than freshman, students must meet the credit-hour requirements indicated below:

Sophomore—30 credit hours
Junior—60 credit hours
Senior—95 credit hours

Credit Load Except for an entering freshman who is restricted to the curriculum requirements of his major course, the credit load for an undergraduate must be approved by his class adviser. The class adviser will approve a credit load deemed in the best interest of the student based on such factors as course requirements, grade-point ratio, participation in other activities, and expected date of graduation.

The maximum number of hours in which a student may enroll is 21, and 15 is the maximum credit hours for those on probation. Written permission of the department head in which the student is a major is required for all registration involving more than 21 hours, or 15 maximum credit hours for those on probation.

ROTC Credit Ten hours of aerospace studies or military science may be counted toward the baccalaureate degree in any curriculum.

Grade-Point Ratio In calculating a student's grade-point ratio, the total number of grade points accumulated by the student is divided by the total number of credit hours taken at Clemson during the semester, session, or other period for which the grade-point ratio is calculated. For each credit hour the student receives grade points as follows: A—4, B—3, C—2, D—1. No grade points are assigned for grades of F, I, or W.

Continuing Enrollment Policy for Undergraduate Students Who Entered Clemson Prior to May 15, 1982 At the end of the academic year in May, all student records are inspected for quality. At that time in order to be able to continue enrollment after the following summer session, a student is required to achieve a cumulative average on the designated total hours attempted at Clemson as follows:

Hours Attempted at Clemson	*Required Minimum Cumulative Average*
12-59	1.4
60-89	1.6
90 or more	1.8

A student completing a regular session has the privilege of continuing his enrollment through the immediately following summer session at Clemson in an effort to meet the above requirements.

A student who has taken fewer than 90 credit hours at Clemson and who fails to meet the required grade-point ratio, as indicated in the table above, may apply for readmission after a minimum of one semester has elapsed. A student who has taken 90-or-more credit hours and fails to meet the required grade-point ratio is permanently ineligible for readmission. Any exceptions to these minimum requirements for continuing enrollment and readmission must be approved by the Appeals Committee on Admissions and Continuing Enrollment.

The above requirements will be applicable through May 1985. At that time, all undergraduate students, regardless of entering date, will be under the new continuing enrollment policy, which is stated below.

Continuing Enrollment Policy for Undergraduate Students Who Enter Clemson after May 15, 1982 At the end of any enrollment period, a notice of academic probation shall be placed on the grade report of an undergraduate student if his/her cumulative grade-point ratio is below 2.0, which is the minimum necessary for graduation.

In the event that a student is placed on academic probation, notification to that effect will be placed on the grade report for that session in which the student's academic deficiency occurred and for each session the student remains on probation. The student who clears probation by returning to the graduating academic requirement (2.0) will have notice to that effect placed on the grade report for that session. No notation concerning probation is placed on the student's permanent record.

A student on academic probation will be subject to suspension or dismissal at the end of a subsequent spring semester and/or summer session if his/her cumulative grade-point ratio is below the minimum standards for continuing enrollment. In exceptional cases, the dean of the college in which the student is enrolled may recommend to the Provost that a student with a grade-point ratio below these standards be suspended or dismissed at the end of any session of enrollment.

The "credit level" used in connection with the minimum cumulative grade-point ratio requirement is based on all credits taken at Clemson,

plus any advanced standing received from transfer credits and credits based on approved examination programs.

Credit Level	*Required Minimum Cumulative Average*
11-20	1.4
21-50	1.6
51-80	1.9
81 or more	2.0

However, a student on probation who averages at least 2.3 grade-point ratio since most recently entering probationary status and passes a minimum of 12 credits each fall and spring semester of enrollment during that period will be permitted to continue enrollment on probation even though his/her cumulative grade-point ratio is below the standard given above.

Initial failure to qualify for continued enrollment will result in suspension from the University for the next regular academic semester. Notice of academic suspension will appear on the permanent record.

Suspended students will be permitted to enroll in summer school and may have their regular enrollment reinstated immediately if the summer school work brings their cumulative grade-point ratio above the minimum standard. In extraordinary cases, suspended students may appeal their suspension after completion of summer school. This appeal may be made to the Appeals Committee on Continuing Enrollment. Only one such appeal may be made before suspension begins.

Upon readmission after suspension, necessarily still on probation, a subsequent failure to meet the requirements for continued enrollment before clearing probation will result in dismissal from the University, and notice of dismissal for reasons of academic ineligibility will be entered on the permanent record. A student who has been dismissed may petition the Appeals Committee on Continuing Enrollment for readmission after at least one regular semester. A denied appeal does not preclude subsequent appeals after an intervening regular semester.

Academic Renewal The student who has not enrolled for a period of two or more academic years after dismissal may apply to the Appeals Committee on Continuing Enrollment for readmission under special conditions known as academic renewal. Under these conditions, the previous credits attempted and quality-point deficit will not constitute a liability in a new grade-point computation. However, no credits passed or their attending quality points will be available to the student for a degree at Clemson. The previous record will appear on the permanent record as well as the notation of readmission under the policy of academic renewal. This policy applies to students who initially enroll at Clemson after May 15, 1982.

Withdrawal from the University A student may withdraw from the University subject to the restrictions in the section on W — Withdraw. Students who exceed these restrictions shall have final grades recorded. Any variance from the restrictions must be approved by the Provost or his designee.

Class Attendance Regular and punctual attendance at all class and laboratory sessions is the responsibility of each student. College work proceeds at such a pace that regular attendance is necessary in order for each student to obtain maximum benefits from instruction. All absences are matters to be resolved between the instructor and the student. In the event that a student finds it necessary to be absent from class, it is the student's responsibility to make up resulting deficiencies.

In an early class the instructor shall inform the students of the attendance policy for that class. (Departments may establish uniform attendance policies for multiple section courses.) A student who incurs excessive absences may be dropped from a course by the instructor.

Students desiring to withdraw from a class must secure a drop card from the Registrar's Office prior to terminating attendance. A student enrolled in the last five weeks of classes shall have final grades recorded.

Course Prerequisites Prerequisites for individual courses are enumerated under the course listings in the Description of Courses. In addition to these requirements, colleges and departments may also establish other standards as conditions for enrollment. In the College of Engineering a grade-point ratio of 1.8 or higher is required for registration in all engineering and engineering technology courses numbered 300 or higher. For undergraduate students who enter Clemson after May 15, 1983, the College of Engineering will require a cumulative grade-point ratio of 2.0 or higher for registration in all engineering and engineering technology courses numbered 300 or higher. In the College of Nursing, a grade-point ratio of 2.0 or higher is required for registration in all nursing courses numbered 300 or higher. The College of Education requires a cumulative grade-point ratio of 1.8 or higher to enroll in 300-level courses and a cumulative grade-point ratio of 2.0 for 400-level education courses. Directed teaching and teaching methods courses require a minimum cumulative grade-point ratio of 2.0.

Auditing Policies Qualified students may audit courses upon the written approval of the professor, head of the department, and the dean of the college concerned, and must register with the Dean of Admissions and Registration. Auditors are under no obligation of regular attendance, preparation, recitation, or examination and receive no credit. Participation in classroom discussion and laboratory exercises by auditors is at the discretion of the instructor. A student who has previously audited a course is ineligible for credit by examination.

A full-time undergraduate student, with approval, may audit courses at no additional charge. A graduate assistant regularly enrolled for a minimum of six semester hours may, with approval, audit additional courses without charge.

Academic Records The student's permanent academic record is maintained in the Registrar's Office and contains personal identifying information, grades, and credits. Where appropriate, statements of a corrective nature, withdrawals, suspension for failure to meet academic standards, suspension for disciplinary reasons, and graduation data are added. It is a historical record of the student's academic progress.

ACADEMIC HONORS

Honor Graduates To be graduated with honors a student must have a minimum cumulative grade-point ratio as follows: cum laude—3.4, magna cum laude—3.7, and summa cum laude—3.9.

Dean's List At the end of the fall and spring semesters of each academic year, a Dean's list shall be compiled of all undergraduate students who have achieved a grade-point ratio of 3.5 or higher on a minimum of twelve semester credit hours of courses taken during the preceding semester. Courses taken on a Pass-Fail basis are excluded from this minimum requirement.

Honors Program The Honors Program of Clemson University is known as Calhoun College, and students enrolled in honors work are called Calhoun Scholars. To enter or to remain in Calhoun College a student must have a cumulative grade-point ratio of 3.4. Admission to Calhoun College for incoming freshmen is by invitation, based primarily on SAT scores and high school academic records.

Calhoun College is under the direction of the chairperson of the Honors Program Committee, a group comprising faculty members from each college. The official *Calhoun College Handbook* is available in the chairperson's office, G11 Tillman Hall.

Students graduating in the Calhoun College program will have the fact indicated on their diplomas.

Honors and Awards The University offers a number of awards for outstanding achievement in specific fields and endeavors. Recipients are chosen by selection committees and are announced at the annual Honors and Awards Day program or other appropriate ceremonies. Detailed information relating to such awards is available in the offices of the academic deans and department heads.

GRADUATION REQUIREMENTS

A candidate for an undergraduate degree is a student who has turned in a completed diploma application by the deadline prescribed in the University Calendar for a particular graduation date.

Residence Requirement In order to qualify for an undergraduate degree, a student must spend at least the last year of residence at Clemson and complete at Clemson a minimum of 30 of the last 36 credits presented for the degree.

Examinations on F Received in Last Semester A candidate for a degree who, in the semester immediately prior to graduation, fails to graduate because of an F on one course taken in that semester may stand a special examination on the course provided:

1. That the candidate can furnish evidence of having done satisfactory study for the examination.
2. That the examination is not given until after the regular degree date.

3. That the candidate has fulfilled, prior to the due date for candidates' grades, all other requirements for his degree except those which can be fulfilled by passing the examination.

4. That the candidate by removing the F by examination will finish all requirements for his degree which will be awarded on the next regular date for award of degrees.

Make-up of I's Received in Last Semester A candidate for a degree who in the semester immediately prior to graduation receives one or more grades of I shall have an opportunity of removing the unsatisfactory grades provided the final grades are received in the Office of Admissions and Registration by the time grades for candidates for graduation are due.

A candidate who qualifies for graduation under this regulation will be awarded his degree on the regular date for the award of degrees.

Special Requirements A cumulative grade-point ratio of 2.0 is required for graduation. Candidates for degrees are required to apply for their diplomas within three weeks following the opening of the final semester or the opening of the summer session prior to the date the degrees are to be awarded. These applications should be filled out in the Office of Admissions and Registration on the regular blanks provided.

All work for a degree must be completed, all financial settlements made, and all government property and library books returned by 5 p.m. on the Tuesday preceding graduation.

Credit Limitation If all work toward a degree is not completed within five years after entrance, the student may be required to take additional courses.

DEGREES AND CURRICULA

Undergraduate curricula are offered under the colleges of Agricultural Sciences, Architecture, Commerce and Industry, Education, Engineering, Forest and Recreation Resources, Liberal Arts, Nursing, and Sciences.

The University grants the following degrees upon satisfactory completion of the requirements prescribed by the colleges listed.

College of Agricultural Sciences	
Agricultural Economics and Rural Sociology	BS
Agricultural Business	
Community and Rural Development	
Agricultural Education†	BS
Agricultural Engineering*	BS
Agricultural Mechanization and Business	BS
Animal Industries	BS
Animal Science	
Dairy Science	
Poultry Science	
Economic Biology	BS
Economic Zoology	
Entomology	
Plant Pathology	
Food Science	BS
Plant Sciences	BS
Agronomy—Crops and Soils	
Horticulture—Fruit and Vegetable, Ornamental, and Turfgrass	
College of Architecture	
Architecture	BArch
Building Science and Management	BS
Design	BA, BS
College of Commerce and Industry	
Accounting	BS
Administrative Management	BS
Economics	BA, BS
Financial Management	BS
Industrial Management	BS
Textile Chemistry	BS
Textile Science	BS
Textile Technology	BTT
College of Education	
Agricultural Education†	BS
Early Childhood Education	BA
Elementary Education	BA
Graphic Communications	BS
Industrial Education	BS
Science Teaching	BS
Biological Sciences	
Chemistry	
Earth Science	
Mathematical Sciences	
Physical Sciences	
Secondary Education	BA
Economics	
English	
History	
Mathematical Sciences	
Modern Languages	
Natural Sciences	
Political Science	
Psychology	
Sociology	
College of Engineering	
Agricultural Engineering*	BS
Ceramic Engineering	BS
Chemical Engineering	BS
Civil Engineering	BS
Computer Engineering	BS
Electrical Engineering	BS
Engineering Analysis	BS
Engineering Technology	BS
Industrial Engineering	BS
Mechanical Engineering	BS
College of Forest and Recreation Resources	
Forest Management	BS
Parks, Recreation, and Tourism Management	BS
Wood Utilization	BS
College of Liberal Arts	
English	BA
History	BA
Modern Languages	BA

*Jointly administered by the College of Agricultural Sciences and the College of Engineering.
†Jointly administered by the College of Agricultural Sciences and the College of Education.

Political Science	BA
Psychology	BA
Sociology	BA
College of Nursing	
Nursing	BS
College of Sciences	
Biochemistry	BS
Botany	BA, BS
Chemistry	BA, BS
Computer Science	BS
Geology	BA, BS
Mathematical Sciences	BA, BS
Medical Technology	BS
Microbiology	BS
Physics	BA, BS
Prepharmacy	Nondegree
Prephysical Therapy	Nondegree
Zoology	BA, BS

BACHELOR OF ARTS AND BACHELOR OF SCIENCE IN PREPROFESSIONAL STUDIES

Clemson University will award the degree of Bachelor of Arts or Bachelor of Science in Preprofessional Studies to a student who has satisfactorily completed three years of undergraduate work in an appropriate curriculum and the first year of work in an accredited medical, dental, veterinary, law, or other accredited, professional, postgraduate school, provided the student fulfills the requirements for the three-year program as follows and the other specified conditions are met.

1. At least two of the three years of preprofessional work, including the third year, must be taken in residence at this University.

2. A minimum of three years of undergraduate work (i.e., preprofessional school credit) must be presented.

3. Normal progress must have been made toward fulfilling the degree requirements of the curriculum in which the student is enrolled at Clemson.

4. The student applying for the Bachelor of Arts or Bachelor of Science in Preprofessional Studies must be recommended by the college at Clemson in which the curriculum that he/she is majoring as a Clemson student is located or by the college in which three years of normal progress toward a degree can be identified.

5. If the combination of preprofessional work taken and the work in the first year of professional school is equivalent to that which is required in some other bachelor's degree program at Clemson, the college concerned may recommend the other bachelor's degree.

The above requirements and conditions became effective July 1, 1974, and will apply to all students who satisfy these requirements and conditions after that date.

A Clemson student having left the University before receiving the bachelor's degree (prior to July 1, 1974), and having enrolled immediately in an accredited, professional, postgraduate school may apply for a bachelor's degree from Clemson and have his/her application considered on an individual basis. The college(s) at Clemson considering the application are authorized to examine the student's entire record in both preprofessional and professional studies and exercise their own judgment concerning the three-year requirement for preprofessional studies.

SECOND BACCALAUREATE DEGREE

To complete a second baccalaureate degree, a student must complete a minimum of 30 semester hours at Clemson in addition to the greater number of hours required for either degree and satisfy all course and grade requirements for the second degree. It should be noted that a student in the College of Liberal Arts may be awarded a single baccalaureate degree with a double major.

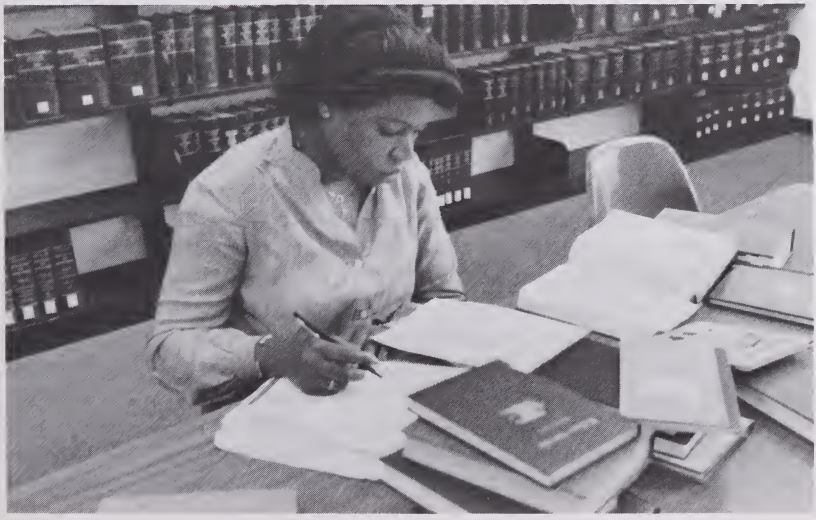
GRADUATE DEGREES

The degrees of Doctor of Philosophy, Doctor of Education, Education Specialist, Master of Arts, Master of Science, Master of Agricultural Education, Master of Agriculture, Master of Architecture, Master of City and Regional Planning, Master of Education, Master of Engineering, Master of Fine Arts, Master of Forestry, Master of Industrial Education, Master of Nutritional Sciences, Master of Public Accountancy, and Master of Recreation and Park Administration are awarded to those students who satisfactorily complete prescribed graduate programs. The Master of Business Administration degree is available through a joint program with Furman University.

For further information concerning advanced degrees see *The Graduate School Announcements,* which may be obtained from the Office of the Dean of Graduate Studies.

COURSE NUMBERS

In the curricula which follow are given the official titles and number of the courses, the descriptive titles, the number of semester hours credit, and in parentheses, the number of hours per week in class and laboratory, respectively.



COLLEGE OF AGRICULTURAL SCIENCES

Modern agriculture involves the science, business, and art of producing, processing, and distributing plant and animal products and includes economics and human relations associated with these activities. Agriculture is a unique educational area because of the economic and human welfare implications in the application of the basic sciences to biological problems and materials.

Thousands of agricultural graduates are needed annually to serve this basic industry. Our land-grant colleges and universities are graduating less than the number demanded to fill careers with a future, with a challenge, and careers that indeed serve humankind.

Today's agriculture includes much more than farm production. Agriculture is a complex profession. About 6 million people provide supplies and services for farmers, and 10 million process and distribute farm products. These two segments, together with farm production which employs 5 million workers, provide careers somewhere in agriculture for 21 million Americans—approximately one-third of all jobs.

The College of Agricultural Sciences offers eight Bachelor of Science majors, two of which are jointly administered with other colleges: Agricultural Education with the College of Education and Agricultural Engineering with the College of Engineering. Within these eight degree majors, a student may select one of 16 curricula as follows: Agricultural Economics and Rural Sociology with curricula in Agricultural Business and Community and Rural Development; Agricultural Education; Agricultural Engineering; Agricultural Mechanization and Business; Animal Industries with curricula in Animal Science, Dairy Science, and Poultry Science; Economic Biology with curricula in Economic Zoology (emphasis in Wildlife and Fisheries Biology), Entomology, and Plant Pathology; Food Science; and Plant Sciences with a curriculum in Agronomy and three curricula in Horticulture: Fruit and Vegetable, Ornamental, and Turfgrass.

MINOR CONCENTRATIONS

The curricula in agriculture are designed to provide a solid foundation of principles on which to solve problems and to do this in a practical setting of real-world situations. A minor is required in all curricula except Agricultural Engineering, Agricultural Mechanization and Business, Dairy Science, and all curricula in the Economic Biology major. Six formal minors have been established as follows:

Business This minor emphasizes principles and practices of business management as applied to businesses and industries associated with agriculture. It is designed for students who plan to work with one of the many businesses and industries that provide supplies and services for the farmer and process and distribute farm products.

Environmental Science This minor emphasizes an understanding of the environment, including cause-and-effect relationships. It is designed

for students who wish to supplement their undergraduate majors with knowledge and skills uniquely applicable to the environment in relation to agriculture.

International Agriculture This minor emphasizes the international aspects of agriculture and applies basic scientific principles and agricultural practices to worldwide agriculture. It is designed for students who contemplate work in international agricultural positions either in the United States or abroad.

Production This minor emphasizes the application of scientific principles to agricultural production. It is designed for students whose anticipated work requires broad general training in scientific and practical agriculture.

Science This minor emphasizes the basic sciences that prepare students to contribute to the advancement of knowledge in their respective fields. It is designed for students whose anticipated work requires considerable scientific training, usually including graduate studies.

Second Department This minor emphasizes special training in an area of study other than the major. A Second Department minor may be selected either within or outside of the College of Agricultural Sciences. It is designed for students who wish additional specialized training outside their major area of study.

GRADUATE STUDY

The College of Agricultural Sciences also offers programs leading to the Master of Agriculture, Master of Agricultural Education, Master of Nutritional Sciences, Master of Science, and Doctor of Philosophy degrees.

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

The Agricultural Economics and Rural Sociology major includes curricula in Agricultural Business and Community and Rural Development.

AGRICULTURAL BUSINESS

The curriculum in Agricultural Business places emphasis on a strong background in economics with applications to agricultural and agriculturally-related businesses. Also included are courses in basic agricultural and biological sciences, liberal arts, and business. Students also have sixteen hours of free electives that may be used for further specialization or to broaden the educational experience.

Employment opportunities open to graduates with an Agricultural Business curriculum are many. These include sales and promotional work for a variety of businesses, management positions in the farm-loan departments of private banks or with cooperative farm credit agencies, public relations activities for various firms, market managers and directors, county agents, representatives of government agencies serving agriculture, and operators of numerous enterprises.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro. to Animal Ind.	3 (2,3)	AGRIC 104 Intro. to Plant Sci.	3 (2,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
Mathematical Sciences Option[2]	3-4	Mathematical Sciences Option[2]	3
Physical/Biological Science Requirement[3]	7	Physical/Biological Science Requirement[3]	7
	16-17		16

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3 (3,0)	ACCT 202 Principles of Accounting	3 (3,0)
ECON 212 Principles of Economics	3 (3,0)	AGEC 202 Agricultural Economics	3 (3,0)
Literature Requirement[1]	3	English Requirement[4]	6
Mathematical Sciences Option[2]	3	Mathematical Sciences Option[2]	3
Physical/Biological Science Requirement[3]	3	Elective	3
Social Science Elective[5]	3		18
	18		

JUNIOR YEAR

AGEC 308 Quant. Agric. Econ.	3 (3,0)	Adv. Econ. Requirement[7]	3
ECON 314 Inter. Econ. Theory	3 (3,0)	Agricultural Econ. Requirement[6]	6
RS 301 Rural Sociology	3 (3,0)	Agriculture Elective[10]	3
Agricultural Econ. Requirement	6	Elective	5
Elective	3		17
	18		

SENIOR YEAR

EXST 462 Stat. Applied to Econ.	3 (3,0)	AGEC 406 Seminar	1 (1,0)
Agricultural Econ. Requirement[8]	6	Agricultural Econ. Requirement[8]	6
Agriculture Elective[10]	3	Agriculture Elective[10]	3
Rural Sociology Elective[9]	3	Elective	5-6
	15		15-16

134 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Mathematical Science options
Option A: CPSC 110 or 120, MTHSC 101, 102, EXST 301 or MTHSC 203 (12 credit hours).
Option B: CPSC 110 or 120, MTHSC 106, 210, 301 (13 credit hours).
[3]Seventeen hours of physical and biological sciences are required with at least 6 hours to be chosen from physical sciences and at least 6 hours to be chosen from biological sciences. Physical sciences are defined as astronomy, chemistry, geology, and physics. Biological sciences are defined as biochemistry, biology, botany, genetics, microbiology, zoology.
[4]To be selected from the following: ENGL 231, 301, 304.
[5]To be selected from the following: GEOG 301, HIST 101, 102, 306, 308, POSC 101, 302, PSYCH 201, SOC 201.
[6]Twelve hours to be selected from the following: AGEC 302, 309, 319, 351, 352, 460.
[7]To be selected from the following: ECON 302, 407, 412.
[8]Twelve hours to be selected from the following: AGEC 402, 403, or 409, 413, 452, 456.
[9]To be selected from the following: RS (SOC) 359, 401, 471.
[10]Courses in the College of Agricultural Sciences outside of the Department of Agricultural Economics and Rural Sociology.

COMMUNITY AND RURAL DEVELOPMENT

The curriculum in Community and Rural Development is designed for individuals who wish to pursue a career in development of quality human environments. The curriculum provides interdisciplinary education and training with emphasis on economic development, environmental planning, and human resources. Employment opportunities open to graduates in the Community and Rural Development curriculum include career-oriented positions with private firms, cooperative extension services, and public agencies at local, council of government, state and federal levels. This major also provides an excellent background for professional or graduate study in several disciplines.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 102 Intro. to Animal Ind.	3 (2,3)	AGRIC 104 Intro. to Plant Sci.	3 (2,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
Mathematical Sciences Option[3]	3-4	Mathematical Sciences Option[3]	3
Physical/Biological Science Requirement[2]	8	Physical/Biological Science Requirement[2]	8
	17-18		17

SOPHOMORE YEAR

ACCT 200 Basic Accounting	3 (3,0)	AGEC 202 Agriculture Economics	3 (3,0)
ECON 212 Principles of Economics	3 (3,0)	Earth Science Requirements[5]	2-3
HIST 102 History of the U.S.	3 (3,0)	English Requirement[6]	6
Literature Requirement[1]	3	Mathematical Sciences Option[3]	3
Mathematical Sciences Option[3]	3	Social Science Requirement[4]	3
Elective	3		17-18
	18		

JUNIOR YEAR

AGEC 352 Public Finance	3 (3,0)	RS (SOC) 359 The Community	3 (3,0)
CRD 357 Natural Res. Econ.	3 (3,0)	Advanced Economics Elective[7]	3
ECON 314 Inter. Econ. Theory	3 (3,0)	Planning Elective[8]	3
RS 301 Rural Sociology	3 (3,0)	Minor[11]	6
Minor[11]	3		15
Elective	2		
	17		

SENIOR YEAR

CRD (AGEC) 411 Reg. Impact Analysis	2 (2,0)	CRD (AGEC) 412 Reg. Econ. Dev. Pol.	2 (2,0)
EXST 462 Statistics Applied to Econ	3 (3,0)	Adv. Social Science Elective[10]	3
Adv. Rural Sociology Elective[9]	3	Minor[11]	3
Adv. Social Science Elective[10]	3	Planning Elective[8]	3
Minor[11]	3	Elective	5
Elective	2		16
	16		

134 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Sixteen hours of physical and biological sciences are required with at least six hours to be chosen from physical sciences and at least six hours from biological sciences. Physical sciences are defined as astronomy, chemistry, geology, and physics. Biological sciences are defined as biochemistry, biology, botany, genetics, microbiology, and zoology.
[3]Mathematical Sciences Options
Option A: CPSC 110 or 120, MTHSC 101, 102, and 203 or EXST 301. (12 credit hours.)
Option B: CPSC 110 or 120, MTHSC 106, 210, 301. (13 credit hours.)
[4]To be selected from: GEOG 301, HIST 306, 308, POSC 101, 302, PSYCH 201.
[5]To be selected from: AGM 301, AGRON 202, 404, GEOG 101, GEOL 400.
[6]To be selected from: ENGL 231, 301, 304.
[7]To be selected from: ECON 302, 407, 420, 421, MGT 406.
[8]To be selected from: CAPL 411, 472, 473.
[9]To be selected from: RS (SOC) 401, 471.
[10]To be selected from: GEOG 302, POSC 321, 423, 425, 427, SOC 404, 430, 431, SOC (RS) 303.
[11]See adviser for available minors and course requirements.

AGRICULTURAL EDUCATION

The Agricultural Education major is designed for students who wish to prepare for positions in vocational agriculture, agricultural occupations, and other teaching positions in the secondary schools; engage in other forms of educational work such as agricultural missionary, public relations, and agricultural extension; farming, soil conservation, and other governmental work; business and industry.

This major provides for a broad education in general and professional education including student teaching. In addition to required courses giving a thorough background in the agricultural and biological sciences, a student may minor in *Business, International Agriculture,* or a *Second Department.* Students in other departments in the College of Agricultural Sciences may minor in Agricultural Education and be certified to teach if they meet all requirements.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro. to Animal Ind.	3 (2,3)	AGED 100 Orient. and Field Exper.	1 (0,2)
AGRIC 104 Intro. to Plant Sci.	3 (2,3)	BIOL 104 General Biology II	3 (3,0)
BIOL 103 General Biology I	3 (3,0)	BIOL 106 General Biology Lab. II	1 (0,3)
BIOL 105 General Biology Lab. I	1 (0,3)	CH 102 or 112 General Chemistry	4 (3,3)
CH 101 General Chemistry	4 (3,3)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 102 Intro. to Math. Anal.[2]	3 (3,0)
	17	Elective	1
			16

SOPHOMORE YEAR

AGEC 202 Agric. Economics	3 (3,0)	AGM 206 Agric. Mechanization	3 (2,3)
AGED 201 Intro. to Agric. Ed.	3 (2,3)	AGRON 202 Soils	3 (2,2)
AGM 205 Principles of Farm Shop	3 (2,3)	ENGL 231 Intro. to Journalism	3 (3,0)
CPSC 120 Intro. to Infor. Proc. Sys.	3 (3,0)	or ENGL 301 Pub. Speaking	3 (3,0)
or PHYS 207 General Physics I	4 (3,2)	or ENGL 304 Business Writing	3 (3,0)
Literature Requirement[1]	3	FOR 305 Elements of Forestry	2 (2,0)
Elective	0-1	FOR 307 Elem. of Forestry Lab	1 (0,3)
	16	Social Science Elective[3]	3
		Elective	1
			16

JUNIOR YEAR

AGEC 302 Econ. of Farm Mgt.	3 (2,3)	AGRON 452 Soil Fert. and Mgt.	3 (3,0)
AGM 301 Soil and Water Conserv.	3 (2,3)	or AGRON 301 Fertilizers	2 (2,0)
or AGM 452 Farm Power	3 (2,3)	ANSC 301 Feeds and Feeding	3 (2,3)
ENT 301 General Entomology	3 (2,3)	ED 302 Educational Psychology	3 (3,0)
Approved Agriculture Elective	3	Minor[4]	6
Minor[4]	6	Elective	1-2
	18		16

SENIOR YEAR

AGED 423 Curriculum	2 (2,0)	AGED 400 Supv. Field Exp. II	1 (0,3)
HORT 407 Landscape Design	3 (2,3)	AGED 401 Meth. in Agric. Ed	3 (2,3)
PLPA 301 Plant Pathology	3 (2,2)	AGED 406 Directed Teaching	12 (0,36)
Minor[4]	3	AGED 425 Teaching Agric. Mech.	2 (1,3)
Elective	6		18
	17		

134 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematical sciences courses or electives in lieu of MTHSC 102. Students ineligible for MTHSC 102 will take MTHSC 105 as a substitute for MTHSC 102.

[3]To be selected from the following: HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

[4]See adviser for available minors and course requirements.

AGRICULTURAL ENGINEERING

The graduate in agricultural engineering, with broad training in mathematics, physics, chemistry, and the biological sciences as well as comprehensive coverage of the engineering sciences, is well equipped

to apply engineering to many functions affecting the well-being of mankind. The agricultural engineer is sought by industry and public service organizations primarily for his ability to apply engineering know-how to agricultural production and processing and to the management of land and water resources. Specific areas of interest include power and machinery, soil and water resources engineering, electric power and processing, structures and environment, and food engineering.

This major includes such engineering sciences as mechanics, fluids, thermodynamics, electrical theory, computing devices and systems analyses. The basic agricultural sciences of soils, plants, and animals are included to provide a foundation for agricultural engineering analysis and design. Also included are the important facets of energy conversion, engineering properties of biological materials, research methods, and use of economy and integrity in design.

Graduate programs lead to the Master of Science, Master of Engineering, and Doctor of Philosophy degrees.

Opportunities for employment of agricultural engineering graduates include design engineers, research engineers, production engineers, or as sales engineers with industry; as teachers; research, extension, or field engineers with state and federal agencies; engineers in the private sector; and others.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
ENGR 180 Engineering Concepts	3 (2,2)	PHYS 122 Phys. with Cal. I	3 (3,0)
or Humanistic-Social Elective[2]	3	Basic Science[2]	4 (3,3)
MTHSC 106 Cal. of One Var. I	4 (4,0)	Humanistic-Social Elective[2]	3
Elective	2	or ENGR 180 Engr. Concepts	3 (2,2)
	16	Elective	1
			18

SOPHOMORE YEAR

AGE 221 Soil and Water Resources Engineering I	3 (2,3)	AGE 212 Fund. of Mechanization	3 (2,3)
EG 109 Engr. Graphics	2 (1,3)	EM 202 Engr. Mech. (Dynamics)	3 (3,0)
EM 201 Engr. Mech. (Statics)	3 (3,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	PHYS 222 Phys. with Cal. III	3 (3,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	Plant Science Elective[2]	3
Literature Requirement[1]	3	Elective	1
Elective	1		17
	19		

JUNIOR YEAR

AGE 353 Computational Systems	2 (1,3)	AGE 362 Energy Conv. in Ag. Sys.	3 (2,3)
AGE 355 Engr. Anal. and Creat.	2 (1,3)	AGE 364 Ag. Waste-Mgt. Sys.	2 (2,0)
E&CE 307 Basic Elec. Engr.	2 (2,0)	AGE 433 Design Criteria for Plant and Animal Environment	2 (2,0)
E&CE 309 Elec. Engr. Lab. I	1 (0,2)	AGE 465 Engr. Prop. of Biol. Mat.	2 (1,3)
EM 304 Mechanics of Materials	3 (3,0)	AGRON 202 Soils	3 (2,2)
ME 311 Engineering Thermo. I	3 (3,0)	EM 320 Fluid Mechanics	3 (3,0)
Animal Science Elective[2]	3	Humanistic-Social Elective[2]	3
	16		18

SENIOR YEAR

AGE 431 Agric. Structures Design	3 (2,3)	AGE 416 Agric. Machinery Design	3 (2,3)
AGE 471 Research I	1 (0,3)	AGE 422 Soil and Water Resources Engineering II	3 (2,3)
ECON 200 Economic Concepts	3 (3,0)	AGE 442 Agric. Process Engr.	3 (2,3)
or ECON 211 Prin. of Economics	3 (3,0)	AGE 472 Research II	1 (0,3)
Engineering Science Elective[2]	3	Engineering Science Elective[2]	3
Humanistic Social Elective[2]	3	Humanistic-Social Elective[2,3]	3
Mathematical Sciences Elective[2]	3	Elective	2
	16		18

138 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Electives to be selected in consultation with adviser. (See Policy on Humanities and Social Sciences for Engineering Curricula, page 112).
[3]Not required of students who complete the ROTC program.
Note: Agricultural Engineering curriculum is jointly administered by the College of Agricultural Sciences and the College of Engineering.

AGRICULTURAL MECHANIZATION AND BUSINESS

The major in Agricultural Mechanization and Business is designed to provide an educational program for undergraduate students who desire training in areas which are relevant to a dynamic agricultural enterprise. It is organized with strength both in the business management area and in nonengineering type support of technical agriculture and agribusiness concepts. In order to produce an individual who is well rounded and capable of communicating, the curriculum includes courses in the humanities, social sciences, English composition, and public speaking.

The graduate in agriculture with a major in Agricultural Mechanization and Business should be able to find meaningful and remunerative employment in a variety of situations directly and indirectly related to agricultural production, processing, marketing, and the many services connected therewith.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	AGRIC 103 Intro. to Animal Ind.	3 (2,3)
BIOL 105 General Biology Lab. I	1 (0,3)	AGRIC 104 Intro. to Plant Sci.	3 (2,3)
CH 101 General Chemistry	4 (3,3)	BIOL 104 General Biology II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	BIOL 106 General Biology Lab. II	1 (0,3)
MTHSC 105 Algebra and Trigonometry[3]	5 (5,0)	CH 102 or 112 General Chemistry	4 (3,3)
		ENGL 102 Composition II	3 (3,0)
	16		17

SOPHOMORE YEAR

AGEC 202 Agricultural Economics	3 (3,0)	ACCT 201 Principles of Accounting	3 (3,0)
AGM 205 Principles of Farm Shop	3 (2,3)	AGM 206 Agric. Mechanization	3 (2,3)
EG 109 Engineering Graphics	2 (1,3)	AGM 303 Cal. for Mech. Agric.	3 (2,3)
PHYS 207 General Physics I	4 (3,2)	PHYS 208 General Physics II	4 (3,2)
Literature Requirement[1]	3	English Requirement[2]	3
Social Science Elective[4]	3		
	18		16

JUNIOR YEAR

AGEC 351 Adver. and Merchan.	3 (3,0)	AGEC 302 Econ. of Farm Mgt.	3 (2,3)
or AGEC 352 Public Finance	3 (3,0)	AGEC 309 Econ. of Agric. Mkt.	3 (3,0)
AGM 302 Rainfall, Runoff, and Erosion Control	3 (2,3)	ENGL 301 Public Speaking	3 (3,0)
AGM 406 Mech. and Hydr. Systems	3 (2,3)	Agriculture Elective[5]	3
AGRON 202 Soils	3 (2,2)	Economics Elective[5]	3
Social Science Elective[4]	3	Elective	3
Elective	3		18
	18		

SENIOR YEAR

AGEC 319 Agribusiness Mgt.	3 (3,0)	AGM 404 Farm Structures	3 (2,3)
or AGEC 409 Agribusiness Org.	3 (3,0)	AGM 408 Equip. Sales and Service	3 (3,0)
AGM 402 Drainage, Irrigation, and Waste Management	3 (2,3)	AGM 472 Seminar	1 (1,0)
AGM 452 Farm Power	3 (2,3)	Agriculture Elective[5]	3
AGM 460 Farm and Home Utilities	3 (2,3)	Elective	6
Economics Elective[5]	3		16
	15		

134 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]To be selected from the following: ENGL 231 or 304.
[3]Eligible students may enroll in MTHSC 106 in lieu of 105.
[4]To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.
[5]See class adviser.

ANIMAL INDUSTRIES

The Animal Industries major includes three curricula—Animal Science, Dairy Science, and Poultry Science.

ANIMAL SCIENCE MAJOR

The Animal Science Department emphasizes subject matter dealing with the application of scientific principles to livestock production and processing.

Students will minor in *Business, Environmental Science, International Agriculture, Production, Science,* or a *Second Department.*

Occupations for Animal Science graduates include livestock farming; cattle, swine and sheep breeding; extension livestock specialists; feed specialists; county agents; teaching and research in animal industry; positions with meat packing companies; feed dealers; freezer locker operators; livestock dealers; and livestock commission brokers.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	AGRIC 103 Intro. to Ani. Ind.	3 (2,3)
BIOL 105 General Biology Lab. I	1 (0,3)	AGRIC 104 Intro. to Plant Science	3 (2,3)
CH 101 General Chemistry	4 (3,3)	BIOL 104 General Biology II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	BIOL 106 General Biology Lab. II	1 (0,3)
MTHSC 105 Algebra and Trigonometry[2]	5 (5,0)	CH 102 or 112 General Chemistry	4 (3,3)
	16	ENGL 102 Composition II	3 (3,0)
			17

SOPHOMORE YEAR

ANSC 202 Intro. to Animal Sci.	3 (2,3)	AGEC 202 Agric. Economics	3 (3,0)
CH 223 Organic Chemistry	3 (3,0)	ANPH 301 Physiology and	
and CH 227 Org. Chem. Lab.	1 (0,3)	Anatomy of Domestic Animals	3 (2,3)
or BIOCH 210 Elem. Biochem.	4 (3,3)	or ZOOL 301 Comp. Vert. Anat.	4 (3,3)
or CH 201 General Chemistry	4 (3,3)	ENGL 231 Intro. to Journalism	3 (3,0)
Literature Requirement[1]	3	or ENGL 301 Pub. Speaking	3 (3,0)
Minor[3]	3	or ENGL 304 Business Writing	3 (3,0)
Social Science Elective[4]	3	PHYS 122 Phys. with Cal. I	3 (3,0)
Elective	1	or PHYS 207 Gen. Phys. I	4 (3,2)
	17	Minor[3]	3
		Elective	1
			17

JUNIOR YEAR

ANSC 301 Feeds and Feeding	3 (2,3)	ANSC 306 Livestock Selection	
ANSC 303 Livestock Evaluation	2 (1,3)	and Judging	2 (1,3)
ANSC 351 Meat Ident. and Util.	1 (0,3)	MICRO 305 General Microbiology	4 (3,3)
or ANSC 355 Meats Lab	1 (0,3)	Minor[3]	3
ANSC 353 Meats	2 (2,0)	Social Science Elective[4]	3
GEN 302 Genetics	4 (3,3)	Elective	5
Elective	4		17
	16		

SENIOR YEAR

ANSC 401 Beef Production	3 (3,0)	ANSC 406 Seminar	2 (2,0)
ANSC 403 Beef Production Lab	1 (0,3)	ANSC 408 Pork Production	3 (3,0)
DYSC 453 Animal Reproduction	3 (3,0)	ANSC 410 Pork Production Lab	1 (0,3)
NUTR 401 Fund. of Nutrition	3 (3,0)	ANSC 452 Animal Breeding	3 (3,0)
Minor[3]	3	Minor[3]	3
Elective	4	Elective	5
	17		17

134 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of the MTHSC 105. MTHSC 102 or 106 can substitute for MTHSC 105.
[3]See adviser for available minors and course requirements.
[4]To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

DAIRY SCIENCE MAJOR

The curriculum in Dairy Science is designed to provide the student with an understanding of scientific principles and the application of these principles in the scientific, technical, and business phases of the dairy industry. Completion of required studies in the sciences and humanities and selected courses by the student in areas of personal interest prepares the graduate for a successful chosen profession. A career in the dairy industry is a rewarding one, not only monetarily, but in rendering a service in providing a wholesome, nutritious food for mankind.

Opportunities for dairy science graduates are many. They include the management of production and processing facilities, quality control work for processing units and production organizations, industrial promotion and public relations work in both production and processing fields, dairy and food products engineering, special services, public health service, teaching and research. Special service opportunities are available in state and national breed association work, breeding organizations, industrial supplies, production and processing equipment and supplies. Opportunities in educational activities include positions

with industrial associations, state and federal services and federal programs with foreign assignments.

Students majoring in Dairy Science may emphasize either Production or Manufacturing with sufficient electives to enhance their individual programs.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro. to Ani. Ind.	3 (2,3)	BIOL 104 General Biology II	3 (3,0)
AGRIC 104 Intro. To Plant Sci.	3 (2,3)	BIOL 106 General Biology Lab. II	1 (0,3)
BIOL 103 General Biology I	3 (3,0)	CH 102 or 112 General Chemistry	4 (3,3)
BIOL 105 General Biology Lab. I	1 (0,3)	DYSC 101 Dairy Foods	1 (1,0)
CH 101 General Chemistry	4 (3,3)	or DYSC 102 Mam. Repro.	1 (1,0)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
	17	MTHSC 105 Algebra and Trig.[2]	5 (5,0)
			17

SOPHOMORE YEAR

AGEC 202 Agric. Economics	3 (3,0)	ENGL 231 Intro. to Journalism	3 (3,0)
CH 223 Organic Chemistry	3 (3,0)	or ENGL 301 Public Speaking	3 (3,0)
and CH 227 Org. Chem. Lab.	1 (0,3)	or ENGL 304 Business Writing	3 (3,0)
or BIOCH 210 Elem. Bioch	4 (3,3)	MICRO 305 General Microbiology	4 (3,3)
or CH 201 General Chemistry	4 (3,3)	Science Requirement[4]	3-4
DYSC 201 Intro. to Dairy Sci.	3 (2,3)	Social Science Elective[3]	3
Literature Requirement[1]	3	Elective[5]	3-4
Social Science Elective[3]	3		17
	16		

MANUFACTURING CONCENTRATION

JUNIOR YEAR

First Semester		Second Semester	
ACCT 201 Principles of Accounting	3 (3,0)	AGEC 309 Econ. of Agric. Mkt.	3 (3,0)
DYSC 307 Market Milk	3 (2,3)	DYSC 304 Eval. of Dairy Products	2 (1,3)
FDSC 305 Dairy and Food Engr.	3 (2,3)	MICRO 407 Food and Dairy Micro.	4 (3,3)
GEN 302 Genetics	4 (3,3)	NUTR 401 Fund. of Nutrition	3 (3,0)
Elective[5]	4	Elective[5]	4
	17		16

SENIOR YEAR

DYSC 402 Dairy Manufacturers	3 (2,3)	DYSC 400 Cultured Dairy Products	3 (2,3)
DYSC 409 Dairy Sci. Seminar	2 (2,0)	DYSC 404 Plant Management	3 (2,3)
DYSC 461 Physiol. of Lactation	3 (3,0)	Elective[5]	11
Elective[5]	9		17
	17		

134 Total Semester Hours

PRODUCTION CONCENTRATION

JUNIOR YEAR

First Semester		Second Semester	
AGRON 202 Soils	3 (2,2)	AGRON 423 Field Crops—Forages	3 (3,0)
ANSC 301 Feeds and Feeding	3 (2,3)	or AGEC 302 Econ. of Farm Mgt.	3 (2,3)
DYSC 307 Market Milk	3 (2,3)	ANPH 301 Physiology and Anatomy	
GEN 302 Genetics	4 (3,3)	of Domestic Animals	3 (2,3)
Elective[5]	3	DYSC 310 Dairy Cattle Selection	2 (1,3)
	16	Elective[5]	9
			17

SENIOR YEAR

DYSC 409 Dairy Sci. Seminar	2 (2,0)	ANSC 452 Animal Breeding	3 (3,0)
DYSC 453 Animal Reproduction	3 (3,0)	DYSC 452 Dairy Cattle Feeding and Management	3 (2,3)
DYSC 455 Reproductive Mgt.	1 (0,3)	Elective[5]	11
DYSC 461 Physio. of Lactation	3 (3,0)		17
NUTR 401 Fund. of Nutrition	3 (3,0)		
Elective[5]	5		
	17		

134 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.
[3]To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 101, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.
[4]To be selected from the following: CPSC 110, 120, PHYS 122, 207, or approved courses in chemistry or biochemistry.
[5]At least 12 hours of elective credit must be in an area supporting the student's major. (See adviser for available courses.)

POULTRY SCIENCE MAJOR

This curriculum provides the student with a broad education in science and the humanities and specialized knowledge of the biology of the avian species and of the poultry industry. Avian science courses emphasize the nutrition, physiology, and pathology of domesticated and semi-domesticated birds. The environmental requirements for propagating the various species and for handling eggs and meat are covered.

Minors in *Business, Environmental Science, International Agriculture, Production, Science* or a *Second Department* provide for the student's specialized interests.

Job opportunities include supervisory positions with producers of eggs, broilers, turkeys, or game birds; technical representatives for feed manufacturers, vitamin and mineral suppliers, pharmaceutical and biological houses; extension specialists; teachers or researchers; salesmen or marketing specialists; quality control and poultry products technologists; government graders, inspectors or sanitarians.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	AGRIC 103 Intro. to Animal Industries	3 (2,3)
BIOL 105 General Biology Lab. I	1 (0,3)	AGRIC 104 Intro. to Plant Sci.	3 (2,3)
CH 101 General Chemistry	4 (3,3)	BIOL 104 General Biology II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	BIOL 106 General Biology Lab. II	1 (0,3)
MTHSC 105 Algebra and Trigonometry[2]	5 (5,0)	CH 112 General Chemistry	4 (3,3)
	16	ENGL 102 Composition II	3 (3,0)
			17

SOPHOMORE YEAR

AGEC 202 Agricultural Economics	3 (3,0)	ANPH 301 Physiology and Anatomy of Domestic Animals	3 (2,3)
CH 223 Organic Chemistry[3]	3 (3,0)	ENGL 231 Introduction to Journalism	3 (3,0)
and CH 227 Org. Chem. Lab.	1 (0,3)	or ENGL 304 Business Writing	3 (3,0)
or BIOCH 210 Elem. Biochem.	4 (3,3)	or ENGL 314 Technical Writing	3 (3,0)
or CH 201 General Chemistry	4 (3,3)	MICRO 305 General Microbiology	4 (3,3)
DYSC 201 Intro. to Dairy Sci.	3 (2,3)	Social Science Requirement[4]	3
or ANSC 202 Intro. Animal Sci.	3 (2,3)	Elective	4
PS 201 Poultry Husbandry	3 (3,0)		17
Literature Requirement[1]	3		
Elective	2		
	18		

JUNIOR YEAR

ANSC 301 Feeds and Feeding	3 (3,0)	PS 355 Poultry Products Grading and Technology	3 (2,3)
ENGL 301 Public Speaking	3 (3,0)	PS 402 Poultry Management	3 (3,0)
GEN 302 Genetics	4 (3,3)	PS 403 Poultry Management Lab	1 (0,3)
Social Science Requirement[4]	3	Minor[5]	6
Minor[5]	3	Elective	3
	16		16

SENIOR YEAR

MGT 301 Principles of Management	3 (3,0)	PS 400 Avian Physiology	3 (3,0)
PS 451 Poultry Nutrition	2 (2,0)	PS 454 Least Cost Feed Form	1 (0,2)
PS 453 Poultry Nutrition Lab.	1 (0,3)	PS 460 Seminar	1 (1,0)
PS 458 Avian Micro. and Parasit.	4 (3,3)	Minor[5]	3
Minor[5]	3	Elective	9
Elective	4		17
	17		

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics, computer science, or experimental statistics courses in lieu of MTHSC 105, in consultation with their advisers.
[3]Science minors should schedule CH 223, 227; Business minors may substitute ACCT 201.
[4]To be selected from the following: ED 302, GEOG 101, 301, HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.
[5]See adviser for available minors and course requirements.

ECONOMIC BIOLOGY

The Economic Biology major includes areas of concentration in Economic Zoology, Entomology, and Plant Pathology.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Prin. of Biology I	5 (4,3)	BIOL 111 Prin. of Biology II	5 (4,3)
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 105 Algebra and Trigonometry[2]	5 (5,0)	MTHSC 106 Cal. of One Var. I	4 (4,0)
		or MTHSC 102 Intro. to Math. Anal.	3 (3,0)
		Elective	1
	17		16-17

SOPHOMORE YEAR

AGRON 202 Soils	3 (2,2)	AGEC 202 Agric. Economics	3 (3,0)
CH 223 Organic Chemistry	3 (3,0)	CH 224 Organic Chemistry[3]	3 (3,0)
CH 227 Organic Chemistry Lab	1 (0,3)	GEN 302 Genetics	4 (3,3)
ENT 301 General Entomology	3 (2,3)	PHYS 207 General Physics I	4 (3,2)
Literature Requirement[1]	3	English Requirement[5]	3
Elective[4]	3		17
	16		

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics, computer science, or experimental statistics courses in lieu of MTHSC 105, in consultation with their advisers.
[3]CH 228 is suggested as an elective during second semester.
[4]Economic Zoology majors are required to take WFB 350.
[5]To be selected from one course in footnote 1 or ENGL 304 or 314.

ECONOMIC ZOOLOGY CONCENTRATION

This curriculum is designed for the student interested in careers in applied animal biology. With increased interest and concern for conservation of natural resources and the environment, this area is becoming increasingly technical and will require large numbers of highly trained animal biologists. It is possible for the student in this concentration to elect courses to fit specific needs or interests.

Greatest demands for graduates are in the following areas: research, survey and regulatory positions with state and federal environmental protection, fish, wildlife, and public health agencies; in public relations and sales positions with commercial companies; industrial research and quality control laboratories; conservational, recreational and other public service agencies; and private enterprises.

JUNIOR YEAR

First Semester		Second Semester	
ENGL 301 Public Speaking	3 (3,0)	EXST 301 Introductory Statistics	3 (2,2)
PHYS 208 General Physics II	4 (3,2)	MICRO 305 General Microbiology	4 (3,3)
ZOOL 201 Invertebrate Zoology	4 (3,3)	WFB 416 Fishery Biology	3 (2,3)
Elective[1]	6	ZOOL 202 Vertebrate Zoology	4 (3,3)
	17	Elective[1]	3
			17

SENIOR YEAR

WFB 468 Introduction to Research	2 (1,3)	WFB 499 Wildlife Biology and Fisheries Seminar	1 (1,0)
WFB 463 Directed Research in Fisheries and Wildlife Biology	1 (0,3)	or ENT 462 Seminar	1 (1,0)
or ENT 461 Directed Research in Entomology and Econ. Zool.	1 (0,3)	ZOOL 457 Comparative Physiology	4 (3,3)
WFB 412 Wildlife Management	3 (2,3)	or ANPH 301 Physiol. and Anatomy of Domestic Animals	3 (2,3)
ZOOL 411 Animal Ecology	4 (3,3)	Social Science Elective[2]	3
ZOOL 456 Parasitology	4 (3,3)	Elective[1]	9-10
Social Science Elective[2]	3		17
	17		

134 Total Semester Hours

[1]Electives will be determined by each individual student in consultation with his/her adviser in order to complement and reinforce the student's planned area of study; and must include two courses from the following: AGEC 403, AGRON 402, CAPL 473, CRD 357, CRD (AGEC) 412, ENSC 431, 432, 472, FOR 304, 409, POSC 302.
[2]To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 101, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

ENTOMOLOGY CONCENTRATION

Entomology is a unique scientific discipline which has its basic roots in biology. It is the study of insects, their biology and control. Insects form the largest and most widely distributed class of animals in the world. They affect the lives of everyone and are man's greatest competitors. However, not everything about insects is bad. Some, such as bees, are essential for pollination while others serve as parasites and predators in natural control of pest species.

There are exciting opportunities for professional entomologists in basic and applied areas of work such as (1) development of new and more selective methods of insect control involving both chemical and biologi-

cal agents; (2) pest management practice and consulting; (3) perform services as quarantine and regulatory officials; (4) carry information to the public as extension entomologists; (5) apply knowledge in teaching programs; (6) insect control in the pest control industry; and (7) entomologists in the armed forces.

See page 61 for Freshman and Sophomore Years.

JUNIOR YEAR

First Semester		Second Semester	
ENGL 301 Public Speaking	3 (3,0)	ACCT 201 Principles of Accounting	3 (3,0)
ENT 405 Insect Morphology	4 (3,3)	or EXST 301 Intro. Statistics	3 (2,2)
ENT (WFB) 468 Intro. to Research	2 (1,3)	ENT 410 Insect Taxonomy	3 (1,6)
PHYS 208 General Physics II	4 (3,2)	MICRO 305 General Microbiology	4 (3,3)
ZOOL 201 Invertebrate Zoology	4 (3,3)	Entomology Elective[1]	3
	17	Elective	4
			17

SENIOR YEAR

ENT 461 Directed Research in Entomology and Econ. Zool.	1 (1,0)	ENT 420 Toxicology of Insecticides	3 (2,3)
PLPA 301 Plant Pathology	3 (2,2)	ENT 462 Seminar	1 (1,0)
ZOOL 411 Animal Ecology	4 (3,3)	ENT 470 Insect Physiology	3 (2,3)
Entomology Elective[1]	3	Entomology Elective[1]	3
Social Science Elective[2]	3	Social Science Elective[2]	3
Elective	3	Elective	4
	17		17

134 Total Semester Hours

[1]At least 6 credits must be selected from the following: ENT 401, 402, 403, 404, 455.
[2]To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 101, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

PLANT PATHOLOGY CONCENTRATION

Plant pathology is that branch of science that deals with the nature and control of the diseases of plants. Since man began to cultivate plants for food and fiber production, plant diseases have been a constant threat to the health and productivity of these plants. They have caused severe famines and mass migrations of people from one area to another since the dawn of recorded history. The current annual economic loss to plants from diseases in the United States has been estimated to be in excess of three billion dollars. In 1970 one disease alone on corn caused a loss of approximately one billion dollars in the eastern half of the United States.

Opportunities for graduates in Plant Pathology are dependent upon the level of training, experience, and interest of the graduate. These job opportunities include research with federal, state, industrial, or private agencies; inspection, quarantine and other regulatory work with federal and state agencies; sales and technical service work with industry, especially those industries involved with agricultural pesticides; agricultural extension work, both in the United States and in foreign countries; and teaching at the college or university level.

See page 61 for Freshman and Sophomore Years.

JUNIOR YEAR

First Semester		Second Semester	
MICRO 305 General Microbiology	4 (3,3)	BOT 421 Plant Physiology	4 (3,3)
PHYS 208 General Physics II	4 (3,2)	BOT 431 Intro. Plant Taxonomy	4 (3,3)
or PHYS 221 Phys. with Cal. II	3 (3,0)	ENGL 301 Public Speaking	3 (3,0)
and PHYS 223 Physics Lab. I	1 (0,3)	Plant Pathology Elective[3]	3
PLPA 301 Plant Pathology	3 (2,2)	Elective	3
or FOR 407 Forest Pathology	3 (2,3)		17
Group A Elective[1]	3		
Social Science Elective[2]	3		
	17		

SENIOR YEAR

EXST 301 Introductory Statistics	3 (2,2)	Group A Elective[1]	3
Group A Elective[1]	3	Plant Pathology Elective[3]	3
Plant Pathology Elective[3]	3	Social Science Elective[2]	3
Elective[4]	8	Elective[4]	8
	17		17

134 Total Semester Hours

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[1]Group A Electives. At least 9 credits must be selected from the following: AGRON 405, 407, 452, BIOCH 301, 423, 424, 425, 426, BOT 411, 441, 451, 461, CH 313, 317, ENT 401, 402, FOR 407, MICRO 416, PLPA 301, 451, 456, 458.

[2]To be selected from the following: ED 302, HIST 101, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

[3]At least 9 credits must be selected from BOT 411, MICRO 416, PLPA 451, 456, 458.

[4]Electives shall be determined by each individual student in consultation with his adviser to complement and reinforce the student's planned area of study.

FOOD SCIENCE

The Food Science major is designed to prepare students for the many career opportunities in technical and management areas of the food industry. The food industry, being the nation's largest industry, is becoming increasingly technical and requires large numbers of professional food scientists. World food supplies, particularly those rich in protein, are becoming increasingly critical in many parts of the globe. This situation is expected to accelerate the demand for food scientists.

Opportunities for graduates in Food Science include research positions in government organizations and state experiment stations; supervisory, administrative, research and quality control positions in food processing industries; inspection and grading work with state and federal agencies; consulting, teaching and extension activities with universities and colleges. Students graduating in Food Science are well prepared to pursue postgraduate training in areas such as microbiology, biochemistry, and nutrition, as well as in food science.

The student majoring in Food Science will select a minor in *Business, Environmental Science, International Agriculture, Science,* or a *Second Department* which will emphasize training in an area other than food science and which is designed to supplement the major course of study.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
CH 101 General Chemistry	4 (3,3)	CH 102 or 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
FDSC 101 Man's Struggle for Food	1 (1,0)	MTHSC 106 Cal. of One Var. I	4 (4,0)
MTHSC 105 Algebra and Trig.[2]	5 (5,0)	Elective	2
	17		17

SOPHOMORE YEAR

AGEC 202 Agric. Economics	3 (3,0)	BIOCH 210 Elem. Biochemistry	4 (3,3)
CH 223 Organic Chemistry	3 (3,0)	ENGL 231 Intro. to Journalism	3 (3,0)
and CH 227 Organic Chem. Lab.	1 (0,3)	or ENGL 304 Business Writing	3 (3,0)
or CH 201 General Chemistry	4 (3,3)	FDSC 212 Man's Food Resources	2 (2,0)
PHYS 122 Phys. with Cal. I	3 (3,0)	PHYS 208 General Physics II	4 (3,2)
or PHYS 207 Gen. Phys. I	4 (3,2)	or PHYS 221 Phys. with Cal. II	3 (3,0)
Literature Requirement[1]	3	and PHYS 223 Physics Lab. I	1 (0,3)
Social Science Elective[3]	3	Social Science Elective[3]	3
	16-17		16

JUNIOR YEAR

EXST 301 Introductory Statistics	3 (2,2)	ENGL 301 Public Speaking	3 (3,0)
FDSC 305 Dairy and Food Engr.	3 (2,3)	FDSC 422 Quality Assurance and Sensory Evaluation	2 (2,0)
MICRO 305 General Microbiology	4 (3,3)	FDSC 424 Quality Assurance and Sensory Evaluation Lab	1 (0,3)
NUTR 451 Human Nutrition	3 (3,0)	MICRO 407 Food and Dairy Microbiology	4 (3,3)
Minor[4]	3	Minor[4]	3
Elective	1	Elective	4-3
	17		17-16

SENIOR YEAR

FDSC 401 Food Chemistry I	4 (3,3)	FDSC 402 Food Chemistry II	4 (3,3)
FDSC 403 Food Preservation and Processing I	3 (3,0)	FDSC 404 Food Preservation and Processing II	3 (3,0)
FDSC 405 Food Preservation and Processing Lab. I	1 (0,3)	FDSC 406 Food Preservation and Processing Lab. II	1 (0,3)
FDSC 417 Seminar	1 (1,0)	FDSC 418 Seminar	1 (1,0)
Minor[4]	6	Minor[4]	3
Elective	2	Elective	5
	17		17

134 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.
[3]To be selected from the following: ED 302, HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.
[4]See adviser for available minors and course requirements.

PLANT SCIENCES

The Plant Sciences major includes four curricula—Agronomy (Crops and Soils), Horticulture (Fruit and Vegetable), Horticulture (Ornamental), and Horticulture (Turfgrass).

AGRONOMY (CROPS AND SOILS) MAJOR

Agronomy is the science that deals with field crops and soils. Crop science includes crop management, physiology, ecology, weed control, plant breeding, and genetics. Soil science involves genesis, utilization,

soil physics, chemistry, microbiology, management, and fertility. Agronomy involves the conversion of basic scientific and technological facts into useful systems and the solution of practical production problems.

The graduate may find employment opportunities with federal, state, and private agencies. Agronomists are employed with agrichemical, educational, seed, and other industries in technical, supervisory, and sales positions. Some return to the farm as either manager or owner-manager.

Students majoring in Agronomy (Crops and Soils) will declare a minor in a second department or an interdisciplinary area.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro. to Animal Ind.	3 (2,3)	AGEC 202 Agric. Economics	3 (3,0)
or AGRIC 104 Intro. to Plant Sci.	3 (2,3)	AGRIC 104 Intro. to Plant Science	3 (2,3)
CH 101 General Chemistry	4 (3,3)	or AGRIC 103 Intro. to Animal Ind.	3 (2,3)
ENGL 101 Composition I	3 (3,0)	CH 112 General Chemistry	4 (3,3)
MTHSC 105 Algebra and Trig.[2]	5 (5,0)	ENGL 102 Composition II	3 (3,0)
	15	Social Science Elective[4]	3
			16

SOPHOMORE YEAR

AGRON 202 Soils	3 (2,2)	BOT 205 Plant Form and Function	4 (3,3)
BIOL 103 General Biology I	3 (3,0)	ENGL 231 Intro. to Journalism	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	or ENGL 301 Pub. Speaking	3 (3,0)
CH 223 Organic Chemistry	3 (3,0)	or ENGL 304 Business Writing	3 (3,0)
and CH 227 Organic Chem. Lab.	1 (0,3)	or ENGL 314 Technical Writing	3 (3,0)
or BIOCH 210 Elem. Biochem.	4 (3,3)	PHYS 207 General Physics	4 (3,2)
Literature Requirement[1]	3	Minor[3]	6
Elective[6]	3		17
	17		

JUNIOR YEAR

AGRON 301 Fertilizers[7]	2 (2,0)	AGRON 422 Field Crops—Dicots	3 (3,0)
AGRON 421 Field Crops—Monocots and Specialty Crops	3 (3,0)	AGRON 423 Field Crops—Forages[7]	3 (3,0)
BOT 421 Plant Physiology	4 (3,3)	AGRON 424 Adv. Field Crops Lab.	1 (0,2)
GEN 302 Genetics	4 (3,3)	AGRON 452 Soil Fert. and Mgt.	3 (3,0)
MICRO 305 General Microbiology	4 (3,3)	AGRON 453 Soil Fert. Lab.	1 (0,3)
or PLPA 301 Plant Pathology	3 (2,2)	ENT 301 General Entomology	3 (2,3)
Elective[6]	2	Economic Requirement[5]	3
	18-19	or Social Science Requirement[4]	3
			17

SENIOR YEAR

AGRON 403 Soil Genesis and Classification[7]	2 (1,3)	AGRON 405 Plant Breeding[7]	3 (2,2)
AGRON 407 Prin. of Weed Cont.[7]	3 (2,2)	AGRON 425 Seed Sci. and Tech.[7]	3 (2,2)
AGRON 455 Seminar	1 (1,0)	AGRON 456 Seminar	1 (1,0)
AGRON 490 Soil Organisms in Crop Production[7]	3 (2,3)	AGRON 475 Soil Physics and Ch.[7]	3 (2,3)
Minor[3]	5	Minor[3]	4
Elective[6]	3	Elective[6]	3
	17		17

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or mathematics-related courses in lieu of MTHSC 105. (See adviser for electives.)

[3]See adviser for available minors and course requirements.

[4]To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 101, 325, POSC 201, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

[5]To be selected from AGEC 302, 309, 413, 460 or from list 4 (above).

[6]Suggested elective courses: AGM 205, 206, 301, ANSC 301, 401, BOT 431, 441, 451, CH 313 and 317, CPSC 110, 120, ENT 403, EXST 301, GEOL 101, PHYS 240.

[7]Select at least 6 courses from the following: AGRON 301, 403, 407, 423, 425, 475, 490.

HORTICULTURE (FRUIT AND VEGETABLE) MAJOR

This curriculum provides the student with a basic education in science and the humanities, and the application of both in the scientific, technical, and business phases of the fruit and vegetable industry.

Opportunities in this field of study include vegetable and fruit farm management; inspection of fresh fruit, vegetable and other food products as well as nursery stock. There are many other opportunities as in plant breeding, agricultural extension service work, horticultural research, horticultural teaching and writing, and fruit and vegetable processing. Other occupations include sales and fieldwork with seedsmen and nurserymen, and manufacturers of food, fertilizer, and pesticide products.

Students majoring in the fruit and vegetable phase of Horticulture may choose a minor in *Business, Environmental Science, International Agriculture, Production, Science,* or a *Second Department.*

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro. to Animal Ind.	3 (2,3)	BIOL 104 General Biology II	3 (3,0)
AGRIC 104 Intro. to Plant Science	3 (2,3)	BIOL 106 General Biology Lab. II	1 (0,3)
BIOL 103 General Biology I	3 (3,0)	CH 102 or 112 General Chemistry	4 (3,3)
BIOL 105 General Biology Lab. I	1 (0,3)	ENGL 102 Composition II	3 (3,0)
CH 101 General Chemistry	4 (3,3)	MTHSC 105 Algebra and Trig.[2]	5 (5,0)
ENGL 101 Composition I	3 (3,0)		16
	17		

SOPHOMORE YEAR

AGEC 202 Agric. Economics	3 (3,0)	ENGL 231 Intro. to Journalism	3 (3,0)
AGRON 202 Soils	3 (2,2)	or ENGL 301 Pub. Speaking	3 (3,0)
CH 223 Organic Chemistry	3 (3,0)	or ENGL 304 Business Writing	3 (3,0)
and CH 227 Organic Chem. Lab.	1 (0,3)	ENT 301 General Entomology	3 (2,3)
or BIOCH 210 Elem. Biochem.	4 (3,3)	PHYS 207 General Physics I	4 (3,2)
or CH 201 General Chemistry	4 (3,3)	Social Science Elective[3]	3
HORT 201 General Horticulture	3 (2,2)	Elective	3
Literature Requirement[1]	3		16
	16		

JUNIOR YEAR

HORT 302 Prin. of Veg. Prod.	3 (2,3)	BOT 421 Plant Physiology	4 (3,3)
HORT 305 Plant Propagation	3 (2,3)	GEN 302 Genetics	4 (3,3)
HORT 352 Commercial Pomology	3 (2,3)	Horticulture Elective[5]	3
HORT 455 Small Fruit and Nut Crops	4 (3,3)	Minor[4]	3
Minor[4]	3	Elective	2
Social Science Elective[3]	3		16
	19		

SENIOR YEAR

HORT 409 Seminar	1 (1,0)	HORT 410 Seminar	1 (1,0)
HORT 464 Postharvest Hort.	3 (2,2)	HORT 456 Vegetable Crops	3 (3,0)
PLPA 301 Plant Pathology	3 (2,2)	Horticulture Elective[5]	6
Minor[4]	6	Minor[4]	3
Elective	4	Elective	4
	17		17

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.

[3]To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

[4]See adviser for available minors and course requirements.

[5]To be selected from the following: HORT 303, 304, 308, 310, 406, 407, 412, 413, 415, 416, 454, 461, 470, 471.

HORTICULTURE (ORNAMENTAL) MAJOR

This curriculum is designed to give students a scientific background and technical facilities in the field of ornamental horticulture. Subject matter covers plant materials culture, uses, and planning of ground spaces.

Graduates find careers in nursery work, floriculture, landscape designing, landscape contracting, and park supervision. Other occupations are research personnel, teachers, extension workers, and representatives of fertilizer, machinery, and chemical companies.

Students desiring to major in Ornamental Horticulture may choose a minor in *Business, International Agriculture, Production, Science,* or a *Second Department.*

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	AGRIC 104 Intro. to Plant Science	3 (2,3)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 104 General Biology II	3 (3,0)
CH 101 General Chemistry	4 (3,3)	BIOL 106 General Biology Lab. II	1 (0,3)
ENGL 101 Composition I	3 (3,0)	CH 102 General Chemistry	4 (3,3)
MTHSC 105 Algebra and Trigonometry[2]	5 (5,0)	ENGL 102 Composition II	3 (3,0)
		Elective	1
	16		15

SOPHOMORE YEAR

AGM 301 Soil and Water Cons.	3 (2,3)	AGEC 202 Agric. Economics	3 (3,0)
CH 223 Organic Chemistry	3 (3,0)	AGRON 202 Soils	3 (2,2)
and CH 227 Organic Chem. Lab.	1 (0,3)	ENGL 231 Intro. to Journalism	3 (3,0)
or BIOCH 210 Elem. Biochem.	4 (3,3)	or ENGL 301 Pub. Speaking	3 (3,0)
or CH 201 General Chem.	4 (3,3)	or ENGL 304 Business Writing	3 (3,0)
HORT 201 General Horticulture	3 (2,2)	ENT 301 General Entomology	3 (2,3)
HORT 303 Plant Materials	3 (2,3)	HORT 304 Designing with Herbaceous Plant Materials	3 (2,3)
Literature Requirement[1]	3	PHYS 207 General Physics I	4 (3,2)
	16		19

JUNIOR YEAR

BOT 421 Plant Physiology	4 (3,3)	GEN 302 Genetics	4 (3,3)
HORT 305 Plant Propagation	3 (2,3)	HORT 308 Landscape Design	3 (2,3)
Horticulture Elective[3]	6	HORT 310 Floriculture	3 (3,0)
Social Science Elective[4]	3	Minor[5]	3
Elective	2	Social Science Elective[4]	3
		Elective	2
	18		18

SENIOR YEAR

HORT 409 Seminar	1 (1,0)	HORT 406 Nursery Technology	3 (2,3)
HORT 412 Turfgrass Management	3 (2,3)	HORT 410 Seminar	1 (1,0)
Horticulture Elective[3]	3	PLPA 301 Plant Pathology	3 (2,2)
Minor[5]	6	Minor[5]	6
Elective	3	Elective	3
	16		16

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.

[3]To be selected from the following: HORT 302, 352, 413, 415, 416, 454, 455, 456, 461, 462, 470, 471.

[4]To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

[5]See adviser for available minors and course requirements.

HORTICULTURE (TURFGRASS) MAJOR

The Turfgrass curriculum is designed to prepare the student for a career in the turfgrass industry. The major course of study is supported by a complement of courses to provide the student with a strong background in plant and soil sciences and broad training in the basic sciences and humanities.

Employment opportunities include positions in the design, establishment, and maintenance of fine turf areas for functional, recreational, and ornamental uses. Turfgrass graduates also find rewarding careers as teachers, extension agents, and research technicians. Other opportunities are available in the servicing and sale of specialized turfgrass equipment, fertilizers, chemicals, seed, and sod.

Students majoring in Turfgrass may choose a minor in *Business, Environmental Science, International Agriculture, Production, Science* or a *Second Department.*

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	AGRIC 104 Intro. to Plant Science	3 (2,3)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 104 General Biology II	3 (3,0)
CH 101 General Chemistry	4 (3,3)	BIOL 106 General Biology Lab. II	1 (0,3)
ENGL 101 Composition I	3 (3,0)	CH 102 or 112 General Chemistry	4 (3,3)
MTHSC 105 Alg. and Trig.[2]	5 (5,0)	ENGL 102 Composition II	3 (3,0)
	16	Elective	1
			15

SOPHOMORE YEAR

AGM 205 Principles of Farm Shop	3 (2,3)	AGEC 202 Agric. Economics	3 (3,0)
CH 223 Organic Chemistry	3 (3,0)	AGM 301 Soil and Water Cons.	3 (2,3)
and CH 227 Org. Chem. Lab.	1 (0,3)	AGRON 202 Soils	3 (2,2)
or BIOCH 210 Elem. Biochem.	4 (3,3)	ENGL 231 Intro. to Journalism	3 (3,0)
or CH 201 General Chemistry	4 (3,3)	or ENGL 301 Pub. Speaking	3 (3,0)
HORT 201 General Horticulture	3 (2,2)	or ENGL 304 Business Writing	3 (3,0)
HORT 303 Plant Materials I	3 (2,3)	ENT 301 General Entomology	3 (2,3)
Literature Requirement[1]	3	PHYS 207 General Physics I	4 (3,2)
	16		19

JUNIOR YEAR

AGRON 407 Principles of Weed Control	3 (2,2)	BOT 421 Plant Physiology	4 (3,3)
HORT 305 Plant Propagation	3 (2,3)	HORT 413 Adv. Turfgrass Culture	3 (3,0)
HORT 412 Turfgrass Management	3 (2,3)	Minor[4]	3
Social Science Elective[3]	3	Social Science Elective[3]	3
Elective	6	Elective	5
	18		18

SENIOR YEAR

GEN 302 Genetics	4 (3,3)	AGRON 452 Soil Fert. and Mgt.	3 (3,0)
HORT 409 Seminar	1 (1,0)	HORT 410 Seminar	1 (1,0)
Horticulture Elective[5]	6	PLPA 301 Plant Pathology	3 (2,2)
Minor[4]	6	Minor[4]	6
	17	Elective	2
			15

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105.

[3]To be selected from the following: ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

[4]See adviser for available minors and course requirements.

[5]To be selected from the following: HORT 302, 304, 308, 310, 352, 406, 407, 415, 416, 454, 455, 456, 461, 462, 470, 471.

PREVETERINARY MEDICINE

Under a regional plan, the South Carolina Preveterinary Advisory Committee coordinates a program for all South Carolina residents who are interested in pursuing a career in veterinary medicine. South Carolina residents attending any college or university may apply through the South Carolina Advisory Committee to the University of Georgia College of Veterinary Medicine. Currently, the University of Georgia admits seventeen students each year through arrangements with the Southern Regional Education Board.

Tuskegee Institute in Alabama also has an excellent program in Veterinary Medicine. Applicants to Tuskegee Institute may apply directly to the Institute. Tuskegee currently admits four South Carolina students each year.

Minimum requirements for admission to a college of veterinary medicine generally include the satisfactory completion of a minimum of two years of college in a well-rounded undergraduate degree program. Specific requirements for admission to the University of Georgia College of Veterinary Medicine include the following undergraduate courses: eight semester credits each of English and physics, twelve semester credits of biology and sixteen semester credits of organic and inorganic chemistry. (Chemistry and physics courses must be at the premedical level. They may not be survey courses.) In addition, four semester credits each of microbiology and biochemistry, including laboratories, and three semester credits of animal nutrition are required, but this may be satisfied after enrollment in the College of Veterinary Medicine.

In addition, the South Carolina Preveterinary Committee recommends that in order to be in the best possible competitive position, the applicant complete courses in animal agriculture, genetics, nutrition, biochemistry, and advanced biology subjects. Considerations for selection are character, scholastic achievements, personality, health, experience with animals, general knowledge, and motivation. In the past, competition has been very keen and only those applicants who have shown exceptional ability have been admitted. Specific considerations may include a minimal grade-point average and completion of standardized tests such as the Graduate Record Examination and the Veterinary Aptitude Test.

Since out-of-state students attending Clemson University are ineligible to apply to Georgia or Tuskegee under the South Carolina quota, they should contact and subsequently satisfy the entrance requirements of the specific college(s) of veterinary medicine to which they plan to apply.

Veterinary schools accept students with a broad range of academic backgrounds; therefore, it is recommended that the beginning university student select any undergraduate major and simultaneously complete the courses required for veterinary school entrance and those required for completion of a BS or BA degree. For students selecting Animal Science, Dairy Science, Economic Zoology, or Poultry Science in the

College of Agricultural Sciences and Zoology in the College of Sciences at Clemson University, the basic curricula have been designed to satisfy Georgia's entrance requirements. For further information, contact the chairperson of the Preveterinary Medicine Curriculum Committee.

COLLEGE OF ARCHITECTURE

The Clemson University College of Architecture provides coordinated preprofessional and professional degree programs at undergraduate and graduate levels in preparation for careers in Architecture, City and Regional Planning, Visual Arts, and Building Science. These curricula are not offered elsewhere in the State. The preprofessional offerings of the College also provide an excellent basis for graduate studies in Landscape Architecture and Art and Architectural History.

The College enjoys contracts for creative research and public service in several areas and receives an annual support budget from the Clemson Architectural Foundation to enrich its programs. It is a member of the Association of Collegiate Schools of Architecture, the Associated School of Construction, and the American Planning Association and is accredited by the National Architectural Accrediting Board and the Association of Collegiate Schools of Planning.

The Architectural Foundation, a nonprofit corporation, was established in January 1956 under the Laws of the State of South Carolina and under the sponsorship of the South Carolina Chapter of the American Institute of Architects to facilitate the continuous improvement of architectural and planning education and of the art and technology of building in South Carolina by providing financial and other assistance to the College of Architecture at Clemson University. By this means students in the College of Architecture at Clemson have been able to enjoy instruction, facilities, and conditions of superior quality.

The advantages to the students evolving from the Clemson Architectural Foundation are many. Among these are the programs of celebrated guest critics and lecturers, excellent exhibits of many types—paintings, sculpture, architecture, construction, furniture, ceramics, textiles and other allied arts and crafts—traveling expenses for student field trips and professional activities, and student loans and grants. Visual-aid facilities and gifts to the library are examples of permanent assets provided through Foundation support.

The Clemson Architectural Foundation provides an Overseas Center for Building Research and Urban Study in Genoa, Italy. Graduate students in Architecture, City and Regional Planning, Visual Arts and fourth-year students in Building Science and Management are involved in an intensive one-semester program in the center annually.

The College of Architecture is housed in a modern building complex constructed for its program in 1958 with a major addition completed in 1974. The requisite functions are provided on four levels and arranged around two landscaped courts. The physical facilities reflect the teaching philosophy of the College with working studios related to the Resource Center and the Rudolph Lee Gallery at the building core. The Resource Center houses the rapidly expanding art and architectural library, encompassing a collection of approximately 85,000 slides, over 20,000 volumes, and subscribes to 262 periodicals on art, architecture, building technology, and planning, along with additional materials for student reference,

urban and rural maps, manufacturers' samples, and audio visual equipment. The Rudolph Lee Gallery, open to the public, offers fifteen or more exhibitions annually. These include international shows, as well as works of faculty and students in the College of Architecture. Studios for printmaking, sculpture, painting, photography, and graphic design are appropriately equipped. Building science studios are designed for the production of related studies including construction management and the construction and display of structural models, microfilm viewing, and other graphic aids. A large shop has excellent power tools for wood and metal, hand tools, and benches for construction of light architectural design models and for heavier work related to the curriculum in visual arts.

ENTRANCE REQUIREMENTS

In the interest of both students and the conservation of University resources and to maintain a program of the highest level, admission to the College of Architecture must necessarily be on a selective basis. Annual enrollment quotas are established consistent with space available. Selection considerations include secondary school record and performance in the College Board examination (SAT Test).

Students wishing admission are advised to make application to the University early in the fall of their senior year in high school and to make arrangements for a personal interview with the Dean of the College or department head as early as possible in the year before admission.

PROGRAMS OF STUDY

The study format in the College of Architecture is composed of three couplets, each two years in length and referred to as the 2 + 2 + 2 sequence. The first two years, called "the matrix" are common to all students in the College. This core curriculum gives emphasis to the totality of the design process and affords each student those experiences necessary to understand design at all scales and make a detailed career choice. At the end of the second year, each student is assisted in this selection. These presently include architecture, landscape architecture, building science and construction management, city and regional planning, and visual arts. The degrees granted at the end of undergraduate study are the BA or BS in Design, and the BS in Building Science and Management.

Students in the College of Architecture will not be permitted to advance beyond second year professional courses (Design Studies, Construction Management, Planning Studies, Art and Architectural History, and Building Science) until all coursework in the two-year matrix has been completed.

The final couplet in the 2 + 2 + 2 sequence is at graduate level and involves intensive professional studies commenced as an undergraduate. The professional degrees now offered are the Master of Architecture, Master of City and Regional Planning, and the Master of Fine Arts.

ARCHITECTURE

The architect as a practicing professional has the creative responsibility of designing the buildings which shape our physical environment. To understand the humanistic, economic and technological nature of environmental problems he must have a sound general education. His subsequent professional education must prepare him for a life of continuing change in which problems to be solved will be large and small, for every sort of function, in every type of climate and for every condition of budget.

The curriculum in Architecture is six years in length, embracing either a four-year Bachelor of Arts in Design program or a four-year Bachelor of Science in Design sequence and two years of graduate study. The Design sequences include a minimum of 147 credit hours of study, and an additional 60 hours in the graduate program for a total of 194 credits leading to the first professional degree, Master of Architecture.

The Bachelor of Architecture program is available to a limited number of students who have completed a first degree in Design or its equivalent and who show professional promise. Admission to this program will be with the approval of the College of Architecture Admissions Committee.

BUILDING SCIENCE AND MANAGEMENT

As the largest single industry in the United States and one of the most important, construction offers unlimited opportunities to highly motivated and professionally educated young men and women. Whether the constructor is building single-family residences or a vast industrial complex, future professionals must be skilled in managing people, equipment, and capital, and must have a grasp of construction materials and methods and the complex technology involved in the construction process in this era. The curriculum in Building Science and Management has been structured to provide young people with the unique balance of studies needed to enable them to fill key roles in the industry. The course is now four years in length and leads to the degree of BS in Building Science and Management.

CITY AND REGIONAL PLANNING

The city planner is a member of an essential and complex profession concerned with the programming and guiding of urban and regional development. Our expanding society presents unusual opportunities for Planning graduates in private firms and on public agency staffs. When asked what made a good planner, a leading British professional replied, "A sensitive, creative leader who has lived a bit." He must be able to inte-

grate recommendations of a wide range of specialists. The sociologist, economist, traffic engineer, and ecologist play significant roles in urban growth and change, but the city planner and urban designer must bring the city to physical form with balance and imagination.

Students admitted as candidates for the Master of City and Regional Planning degree must have the following qualifications: (1) meet the admissions requirements for the University Graduate School; and (2) have a baccalaureate degree approved by the school in such fields as architecture, civil engineering, economics, landscape architecture, law, political science, or sociology.

Candidates entering the curriculum from a nondesign discipline will be required to take a special parallel course designed for their needs, and accordingly may be excused from courses in which they have achieved proficiency.

HISTORY AND VISUAL STUDIES

The Department of History and Visual Studies provides required undergraduate courses in architectural and art history and visual arts. The Department also offers a two-year graduate program leading to the Master of Fine Arts degree in Ceramics, Painting, Sculpture, Printmaking, Graphic Design, Photography, and Multimedia. Each of these programs requires a minimum of 60 credit hours. The graduate curricula have an emphasis in creative professional work of high standard. Maximum flexibility is provided in the management of these courses to foster innovative and imaginative solutions to fine arts projects.

BACHELOR OF ARTS IN DESIGN

FRESHMAN YEAR

First Semester		Second Semester	
CAAH 115 History of Art and Architecture I	3 (3,0)	CAAH 116 History of Art and Architecture II	3 (3,0)
CADS 151 Design Studies	4 (2,6)	CADS 152 Design Studies	4 (2,6)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Calculus of One Variable I[3]	4 (4,0)	MTHSC 301 Statistical Theory and Methods I[3]	3 (3,0)
Modern Language	4 (3,1)	Modern Language	4 (3,1)
	18		17

SOPHOMORE YEAR

CAAH 215 History of Art and Architecture III	3 (3,0)	CAAH 216 History of Art and Architecture IV	3 (3,0)
CABS 201 Building Science	3 (2,3)	CABS 202 Building Science	3 (2,3)
CADS 251 Design Studies	7 (2,15)	CADS 252 Design Studies	7 (2,15)
Modern Language	3 (3,0)	Modern Language	3 (3,0)
Visual Arts[2]	3	Visual Arts[2]	3
	19		19

JUNIOR YEAR

CADS 351 Design Studies	7 (2,15)	CADS 352 Design Studies	7 (2,15)
Literature Requirement[1]	3	Literature Requirement[1]	3
Major Studies[4]	6	Major Studies[4]	6
Elective	3	Elective	3
	19		19

SENIOR YEAR

CADS 451 Design Studies	7 (2,15)	CADS 452 Design Studies	7 (2,15)
Major Studies[4]	9	Major Studies[4]	9
Elective	3	Elective	3
	19		19

149 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]CAVA 205, 207, 209, 211, 213, 215, 217.
[3]A sequence of MTHSC 101, 102 and 203 will be accepted in lieu of MTHSC 106 and 301.
[4]Major Studies. (See footnote 6, Major Studies, under the Bachelor of Science in Design curriculum.)

BACHELOR OF SCIENCE IN DESIGN

FRESHMAN YEAR

First Semester		Second Semester	
CAAH 115 History of Art and Architecture I	3 (3,0)	CAAH 116 History of Art and Architecture II	3 (3,0)
CADS 151 Design Studies	4 (2,6)	CADS 152 Design Studies	4 (2,6)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Calculus of One Variable I[5]	4 (4,0)	MTHSC 301 Statistical Theory and Methods I[5]	3 (3,0)
PHYS 115 Classical Physics I[4]	3 (3,0)	PHYS 116 Classical Physics II[4]	3 (3,0)
	17		16

SOPHOMORE YEAR

CAAH 215 History of Art and Architecture III	3 (3,0)	CAAH 216 History of Art and Architecture IV	3 (3,0)
CABS 201 Building Science	3 (2,3)	CABS 202 Building Science	3 (2,3)
CADS 251 Design Studies	7 (2,15)	CADS 252 Design Studies	7 (2,15)
ECON 211 Principles of Economics[3]	3 (3,0)	ECON 212 Principles of Economics[3]	3 (3,0)
Visual Arts[2]	3	Visual Arts[2]	3
	19		19

JUNIOR YEAR

CADS 351 Design Studies	7 (2,15)	CADS 352 Design Studies	7 (2,15)
Literature Requirement[1]	3	Literature Requirement[1]	3
Major Studies[6]	6	Major Studies[6]	6
Elective	3	Elective	3
	19		19

SENIOR YEAR

CADS 451 Design Studies	7 (2,15)	CADS 452 Design Studies	7 (2,15)
Major Studies[6]	9	Major Studies[6]	9
Elective	3	Elective	3
	19		19

147 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]CAVA 205, 207, 209, 211, 213, 215, 217.
[3]ECON 200 and a 300-level economics course may be substituted for ECON 211, 212.
[4]PHYS 207 and 208 will be accepted in lieu of PHYS 115 and 116.
[5]A sequence of MTHSC 101, 102 and 203 will be accepted in lieu of MTHSC 106 and 301.
[6]Major Studies.

The undergraduate programs in Design in the College of Architecture are preparatory to professional study in Architecture, City and Regional Planning, Visual Arts, and Landscape Architecture. Major studies in the third and fourth years consist of 28 credits of Design Studies and 30 credits of coursework to be designated for each professional area as follows:

Architecture (General). 28 credits of Design Studies with emphasis in Architectural Design: CAAH 403, CABS 303, 304, 403, 404, 15 credits of approved electives.

Architecture (Administration). Same as above, except that approved electives are to be selected from the following: ACCT 203, CPSC 120, FIN 306, LAW 312, 3 credits of approved electives.

Architecture (Health Care Facilities). Same as Architecture (General), except that two of the approved electives would be CAAR 485 and HADM 308.

Landscape Architecture. 28 credits of Design Studies with emphasis in Landscape Architecture: 15 credits to be selected from the following: AGM 301, 460, HORT 303, 304 or AGEC 403, and CABS 304 or 403; in addition 15 credits of approved electives.

Planning. 28 credits of Design Studies with emphasis in planning; 30 credits of approved electives.

Visual Arts. 28 credits to Design Studies with emphasis in Visual Arts; 15 credits to be selected from CAAH 400-level courses and CAVA 200,- 300,- or 400-level courses; 15 credits of approved electives.

BACHELOR OF ARCHITECTURE

See Design curricula (Bachelor of Arts or Bachelor of Science)

FIFTH YEAR

First Semester		Second Semester	
CAAR 481 Arch. Office Practice	3 (3,0)	CAAH 405 Hist. of Plan. and Cities	3 (3,0)
CAAR 557 Arch. Design	9 (3,18)	CAAR 558 Arch. Design	9 (3,18)
Elective[1]	3	Elective[1]	3
	15		15

SIXTH YEAR

First Semester

CAAH 403 Hist. of Mod. Arch. Movement	3 (3,0)
CAAR 559 Terminal Project in Architecture	9 (1,24)
Elective[1]	3
	15

[1]Electives shall be determined by each individual student in consultation with his major adviser to complement and reinforce the student's planned area of study.

BACHELOR OF SCIENCE IN BUILDING SCIENCE AND MANAGEMENT

FRESHMAN YEAR

First Semester		Second Semester	
CAAH 115 History of Art and Architecture I	3 (3,0)	CAAH 116 History of Art and Architecture II	3 (3,0)
CADS 151 Design Studies	4 (2,6)	CADS 152 Design Studies	4 (2,6)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Calculus of One Variable I[5]	4 (4,0)	MTHSC 301 Stat. Theory and Methods I[5]	3 (3,0)
PHYS 115 Classical Physics I[4]	3 (3,0)	PHYS 116 Classical Physics II[4]	3 (3,0)
	17		16

SOPHOMORE YEAR

CAAH 215 History of Art and Architecture III	3 (3,0)	CAAH 216 History of Art and Architecture IV	3 (3,0)
CABS 201 Building Science	3 (2,3)	CABS 202 Building Science	3 (2,3)
CADS 251 Design Studies	7 (2,15)	CADS 252 Design Studies	7 (2,15)
ECON 211 Principles of Economics[3]	3 (3,0)	ECON 212 Principles of Economics[3]	3 (3,0)
Visual Arts[2]	3	Visual Arts[2]	3
	19		19

JUNIOR YEAR

CABS 311 Contract Documents	3 (3,0)	CABS 312 Construction Feasibility Studies	3 (3,0)
CABS 351 Construction Management I	3 (0,9)	CABS 352 Construction Management II	3 (0,9)
English Requirement[1]	3	English Requirement[1]	3
Major Studies[6]	6	Major Studies[6]	6
Elective	3	Elective	3
	18		18

SENIOR YEAR

CABS 411 Construction Equipment	3 (3,0)	CABS 412 Foundations and Formwork	3 (3,0)
CABS 451 Construction Management III	3 (0,9)	CABS 452 Construction Management IV	3 (0,9)
Major Studies[6]	9	Major Studies[6]	6
Elective	3	Elective	3
	18		15

140 Total Semester Hours

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[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, 301.
[2]CAVA 205, 207, 209, 211, 213, 215, 217.
[3]ECON 200 and a 300-level economics course may be substituted for ECON 211, 212.
[4]PHYS 207 and 208 will be accepted in lieu of PHYS 115 and 116.
[5]A sequence of MTHSC 101, 102 and 203 will be accepted in lieu of MTHSC 106 and 301.
[6]Major Studies: CABS 303, 304, 404, CPSC 120, CE 201, ACCT 203, LAW 312, plus 6 hours of Major Electives.

TAPS

COLLEGE OF COMMERCE AND INDUSTRY

The programs of the College of Commerce and Industry embrace three major areas: teaching, research, and public service. The College is responsible for eight graduate programs (two in cooperation with other administrative units), nine undergraduate programs, and a series of professional development courses for business and industry. The undergraduate curricula are in the areas of Accounting, Administrative Management, Economics, Financial Management, Industrial Management, Textile Chemistry, Textile Science, and Textile Technology. These curricula are designed to prepare the students for a variety of careers, as well as to furnish an education on which to build for a lifetime. The curricula recognize the need for an understanding of the basic principles of science and appreciation for the nature of human interaction, and the comprehension of the economic, political, and social environment. Flexibility in course selection and choice of areas for emphasis is made possible by secondary concentrations and minors as indicated.

ACCOUNTING

This curriculum leads to the Bachelor of Science degree in Accounting. The degree program is accredited by the American Assembly of Collegiate Schools of Business and is designed to prepare students for professional careers in accounting and management. The major study of accounting is well supported by sequential courses in English, mathematics, management, and economics.

The graduate in Accounting is well prepared for entrance in law school, graduate school, or the practice of accountancy, either public, private, or governmental. The study of accounting in preparation for a career in other areas of management will provide mastery over an essential tool which reinforces experience and judgement in the decision-making process.

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 120 Introduction to Information Processing Systems	3 (3,0)	CPSC 130 Data Processing with Cobol	3 (3,0)
ECON 211 Principles of Economics	3 (3,0)	ECON 212 Principles of Economics	3 (3,0)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 102 Introduction to Mathematical Analysis[3]	3 (3,0)	MTHSC 207 Multivariable Calculus[3]	3 (3,0)
Science Requirement[2]	4 (3,3)	Science Requirement[2]	4
	16		16

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3 (3,0)	ACCT 202 Principles of Accounting	3 (3,0)
MTHSC 301 Statistical Theory and Methods I	3 (3,0)	MASC 310 Introduction to Management Science	3 (3,0)
Humanities Requirement[4]	3 (3,0)	MGT 301 Principles of Management	3 (3,0)
Literature Requirement[1]	3	Social Science Requirement[5]	3
Social Science Requirement[5]	3	Literature Requirement[1]	3
	15	Elective[6]	3
			18

Note: No curriculum in the College of Commerce and Industry leading to the BA, BS, or BTT degree will allow credit for ENGL 100 to be used to satisfy requirements for graduation.

JUNIOR YEAR

ACCT 301 Intermediate Accounting	3 (3,0)	ACCT 302 Intermediate Accounting	3 (3,0)
ACCT 303 Cost Accounting	3 (3,0)	ACCT 422 Accounting Information Systems	3 (3,0)
ENGL 301 Public Speaking	3 (3,0)	ENGL 304 Business Writing	3 (3,0)
FIN 311 Financial Management I	3 (3,0)	FIN 312 Financial Management II	3 (3,0)
MKT 301 Principles of Marketing	3 (3,0)	LAW 312 Commercial Law	3 (3,0)
Emphasis Area[7]	3	Emphasis Area[7]	3
	18		18

SENIOR YEAR

ACCT 404 Individual Taxation	3 (3,0)	ACCT 410 Budget and Executive Control	3 (3,0)
or ACCT 405 Corporate Taxation	3 (3,0)	or MGT 402 Prod. and Op. Mgt. I	3 (3,0)
ACCT 407 Accounting Research I	1 (1,0)	MGT 415 Business Policy	3 (3,0)
ACCT 411 Advanced Accounting	3 (3,0)	Accounting Requirement[8]	6
ACCT 415 Auditing	3 (3,0)	Elective[6]	3
Elective[6]	6		15
	16		

132 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209, or a modern foreign language literature at the 300 or higher level.

[2]Science requirement includes any natural or physical science with laboratory.

[3]Either MTHSC 102 or 106 and either MTHSC 207 or 108 may be taken to satisfy the freshman mathematics requirements. Use elective credits to satisfy the difference in hours.

[4]To be selected from history, philosophy, religion, music appreciation or art history.

[5]To be selected from POSC 101, PSYCH 201, SOC 201.

[6]Elective credits may be taken in any combination of 1,- 2,- 3,- or 4-hour courses, but see footnote 3 above.

[7]The emphasis area is designed to allow a student to concentrate in an area of accounting or one of the following fields: computer science, finance, law, management science, or mathematical science. It must be chosen in consultation with the student's adviser.

[8]To be selected from ACCT 403, 404, 405, 410, 416, 425, 430.

Note: Accounting majors are required to earn a grade of C or higher in all accounting courses which are required or which are used to satisfy Accounting requirement credits.

ENGL 100, MTHSC 101 and 105 may not be counted in computing the minimum number of credit hours required for graduation with a BS in Accounting degree.

ADMINISTRATIVE MANAGEMENT

The Bachelor of Science degree in Administrative Management is designed for those students interested in careers as professional managers in the less technical areas of management. Such areas include marketing; personnel administration; purchasing; and public administration at the local, state and national levels. In addition, the qualified graduate of this curriculum will have a background suitable for pursuing graduate study in such areas as marketing, transportation, finance, and economics, as well as the behavioral sciences. The program is accredited by the American Assembly of Collegiate Schools of Business.

The program of study included in the Administrative Management curriculum is designed to provide the student with (1) an appreciation of the social, political, and economic environments in which business firms must operate; (2) knowledge of the functional areas of business, their interrelationship and use of analytical methods in solving problems; and (3) a facility in the use of mathematics, statistics, and the behavioral sciences in performing managerial functions.

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 120 Intro. to Inform. Proc. Sys.	3 (3,0)	ECON 211 Principles of Economics	3 (3,0)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 102 Intro. to Math. Anal.[2]	3 (3,0)	MTHSC 207 Multivariable Cal.[2]	3 (3,0)
POSC 101 American National Govt. or History Requirement	3 (3,0) 3	POSC 101 American National Govt. or History Requirement	3 (3,0) 3
Science Requirement[2]	4	Science Requirement[2]	4
Elective	1	Elective	1
	17		17

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3 (3,0)	ACCT 202 Principles of Accounting	3 (3,0)
ECON 212 Principles of Economics	3 (3,0)	ECON 301 Economics of Labor	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	MGT 304 Stat. Quality Control	3 (3,0)
PSYCH 201 Intro. to Psychology	3 (3,0)	SOC 201 Intro. to Sociology	3 (3,0)
Literature Requirement[1]	3	Elective	4
Elective	1		
	16		16

JUNIOR YEAR

ACCT 307 Managerial Accounting	3 (3,0)	ENGL 304 Business Writing	3 (3,0)
ENGL 301 Public Speaking	3 (3,0)	FIN 306 Corporation Finance	3 (3,0)
LAW 322 Legal Environ. of Business	3 (3,0)	MASC 310 Intro. to Mgt. Sci.	3 (3,0)
MGT 301 Principles of Management	3 (3,0)	MGT 307 Personnel Management	3 (3,0)
MKT 301 Principles of Marketing	3 (3,0)	Elective	4
Elective	3		
	18		16

SENIOR YEAR

MGT 400 Mgt. of Org. Behav.	3 (3,0)	MGT 407 Directed Research	1 (1,0)
MGT 402 Prod. and Op. Mgt. I	3 (3,0)	MGT 415 Business Policy	3 (3,0)
MGT 418 Management Info. Sys.	3 (3,0)	MKT 450 Marketing Management	3 (3,0)
MGT 499 Computer Utilization II	1 (1,0)	Approved Elective[5]	9
Management Option[4]	6		
	16		16

132 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Credits earned in MTHSC 106, 108 may be substituted for MTHSC 102, 207 and elective credits.
[3]Must be a two-semester sequence from the following: CH 101, 102; BIOL 103, 104; or PHYS 207, 208.
[4]Management Options. In the senior year, the student must complete one of two Management options. To receive credit, at least two courses in the option must be completed.
Regional Analysis: ECON (MGT) 409 and MGT 405 or 406.
Logistics: MGT 417 and ECON 419 or MGT 420.
[5]One course from each of the three areas listed is required for the nine hours of approved electives. Six hours of the free elective must be in nonbusiness areas.
Economics: ECON 302, 308, 309, 407, 419, 424.
Marketing: MKT 402, 423, 431, 432.
Management: Any senior-level course in the Department of Management.

ADMINISTRATIVE MANAGEMENT—OCCUPATIONAL SAFETY AND HEALTH MAJOR

The Bachelor of Science degree in Administrative Management with Occupational Safety and Health major is designed for those students interested in careers as professional managers. This concentration provides the student with an indepth knowledge of the field of occupational safety and health. It prepares the student to fulfill industry's increasing need for managers and coordinators of safety programs. While concentrated, the course of study is designed to prepare students for careers in the less technical areas of management in the following areas: personnel management, marketing, purchasing, and public

administration at the local, state, and federal levels. In addition, the qualified graduate of this curriculum will have a background suitable for pursuing graduate study in such areas as marketing, transportation, finance, business administration, behavioral sciences, and economics.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 102 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	CPSC 120 Intro. to Infor. Proc. Sys.	3 (3,0)
MTHSC 102 Intro. to Math. Anal.[2]	3 (3,0)	ECON 211 Principles of Economics	3 (3,0)
POSC 101 Amer. Natl. Govt.	3 (3,0)	ENGL 102 Composition II	3 (3,0)
History Elective[3]	3 (3,0)	MTHSC 207 Multivariable Cal.[2]	3 (3,0)
	16		16

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3 (3,0)	ACCT 202 Principles of Accounting	3 (3,0)
ECON 212 Principles of Economics	3 (3,0)	ENGL 301 Public Speaking	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	MGT 304 Stat. Quality Control	3 (3,0)
PSYCH 201 Intro. to Psychology	3 (3,0)	PSYCH 364 Industrial Psychology	3 (3,0)
Literature Requirement[1]	3	SH 201 Intro. to Safety and Health Mgt.	3 (3,0)
Elective	1	Elective	1
	16		16

JUNIOR YEAR

FIN 306 Corporation Finance	3 (3,0)	ENGL 304 Business Writing	3 (3,0)
MGT 301 Principles of Management	3 (3,0)	or ENGL 314 Technical Writing	3 (3,0)
MASC 310 Intro. to Mgt. Sci.	3 (3,0)	MGT 307 Personnel Management	3 (3,0)
SH 301 Industrial Accident Prevention and Loss Control I	3 (3,0)	SH 302 Industrial Accident Prevention and Loss Control II	3 (3,0)
SH 303 Intro. to Ind. Hygiene	3 (3,0)	SH 304 Ind. Hygiene Practice	4 (3,3)
Economics Elective[4]	3	Economics Elective[4]	3
	18		16

SENIOR YEAR

MKT 301 Principles of Marketing	3 (3,0)	MGT 402 Prod. and Operations Mgt. I	3 (3,0)
MGT 418 Management Inform. Sys.	3 (3,0)	MGT 407 Directed Research	1 (1,0)
MGT 499 Computer Utilization II	1 (1,0)	MGT 415 Business Policy	3 (3,0)
LAW 322 Legal Environ. of Bus.	3 (3,0)	SH 402 Fire Protection and Prev.	3 (3,0)
SH 401 Fund. of Fire and Explosion	3 (3,0)	SH 404 Sem. In Safety and Health	3 (3,0)
Elective	6	Elective	6
	19		19

136 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]Credits earned in MTHSC 102 and 108 may be substituted for MTHSC 102, 207. (MTHSC 105 is not counted in degree requirements.)

[3]To be selected from the following: HIST 101, 102, 172, 173, 304, 306.

[4]Select at least two of the following: ECON 301, 308, 309, 314, 420, 424, ECON (MGT) 409, FIN (ECON) 304.

ECONOMICS

A bachelor's degree in Economics provides a thorough understanding of the economic system and prepares the student for a broad choice of career opportunities. By combining general education courses, a minor or option, and a strong major in economics, students can prepare themselves for specialized graduate studies and careers in business and government.

The Department of Economics offers two degree paths for the undergraduate. The Bachelor of Arts degree is distinguished by its emphasis on the language skills and the humanities. A broad choice of minors is available for this program. The Bachelor of Science program emphasizes quantitative skills and particular preparation for careers in business and offers a structured selection of options.

BACHELOR OF ARTS IN ECONOMICS

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 110 Elem. Comp. Prog.	3 (3,0)	ENGL 102 Composition II	3 (3,0)
or CPSC 120 Intro. to Inf. Proc. Sys.	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 101 Finite Probability[2]	3 (3,0)
MTHSC 102 Intro. to Math. Anal.[2]	3 (3,0)	Modern Language	4 (3,1)
Modern Language	4 (3,1)	Science Requirement[3]	4
Science Requirement[3]	4	Elective	1
Elective	1		18
	18		

SOPHOMORE YEAR

ECON 211 Principles of Economics	3 (3,0)	ECON 212 Principles of Economics	3 (3,0)
HIST 173 Western Civilization	3 (3,0)	MTHSC 207 Multivariable Cal.[2]	3 (3,0)
MTHSC 203 Elem. Stat. Inference[2]	3 (3,0)	Literature Requirement[1]	3
Literature Requirement[1]	3	Modern Language	3 (3,0)
Modern Language	3 (3,0)	Social Science Requirement	3
Elective	1	Elective	2
	16		17

JUNIOR YEAR

ACCT 200 Basic Accounting	3 (3,0)	ECON 407 National Income and	
or ACCT 201 Prin. of Acct.	3 (3,0)	Employment Analysis	3 (3,0)
ECON 314 Inter. Econ. Theory	3 (3,0)	Humanities[4]	3
Humanities[4]	3	Major[5]	3
Major[5]	3	Minor	6
Minor	3		15
	15		

SENIOR YEAR

Major[5]	6	Major[5]	6
Minor	6	Elective	10
Elective	3		16
	15		

130 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]The sequence MTHSC 101, 102, 203, 207 may be replaced either by MTHSC 102, 207, 210, 301 or 106, 207, 210, 301.

[3]Two courses, totaling eight hours, in the same science are required.

[4]To be selected from English, humanities, modern language, music, philosophy, religion, visual arts.

[5]Twenty-four semester hours in economics above the sophomore level are required, including ECON 314 and 407. ECON 101 and 203 do not count toward the major. Major credit may include up to 6 hours selected from ECON (MASC) 311, ECON (MGT) 409, HIST 306, IE 484, MGT 406. (Those seeking certification will be required to complete more than 130 semester hours.)

MINOR CONCENTRATION

Any minor approved by the College of Liberal Arts, including the Cluster Minor, and any minor concentration offered by any other department in the College of Commerce and Industry is acceptable as a minor for the Bachelor of Arts curriculum in Economics.

Students who wish to combine the curriculum in Economics with secondary school teaching should elect to take the degree in Education with a teaching area in Economics. The courses will be those required for teaching certification as specified by the South Carolina Department of Education as well as those economics courses required for an Economics major. Requirements for a major in Education with a teaching area in Economics are shown under the College of Education.

A minor in Economics is provided for other degree programs consisting of 15 hours above the sophomore level which must include ECON 314 and 407.

BACHELOR OF SCIENCE IN ECONOMICS

FRESHMAN YEAR

First Semester		Second Semester	
ACCT 201 Principles of Accounting	3 (3,0)	ACCT 202 Principles of Accounting	3 (3,0)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
MTHSC 106 Cal. of One Var.I[3]	4 (4,0)	MTHSC 207 Multivariable Calculus[3]	3 (3,0)
Science Requirement[2]	4	Science Requirement[2]	4
	17	Elective	1
			17

SOPHOMORE YEAR

CPSC 110 Elem. Comp. Prog. or CPSC 120 Intro. to Inf. Proc. Sys.[4]	3 (3,0)	ECON 212 Principles of Economics	3 (3,0)
ECON 211 Principles of Economics	3 (3,0)	FIN 306 Corporation Finance	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I[3]	3 (3,0)	MTHSC 210 Applied Matrix Alg.[3]	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Social Science Requirement[5]	3	Social Science Requirement[5]	3
Elective	1	Elective	1
	16		16

JUNIOR YEAR

ECON 314 Inter. Econ. Theory	3 (3,0)	ECON 407 National Income and Employment Analysis	3 (3,0)
LAW 312 Commercial Law or LAW 322 Legal Environment of Business	3 (3,0)	Major[6]	3
Major[6]	3	Option	3
Option	3	Elective	6
Elective	4		15
	16		

SENIOR YEAR

Major[6]	6	Major[6]	6
Option	6	Option	5-3
Elective	6	Elective	6-8
	18		17

132 Total Semester Hours

OPTIONS

Rather than having a minor or secondary concentration as in the Bachelor of Arts program in Economics, a student in the Bachelor of Science program selects one of several options. These options generally consist of 15 hours of a certain core of study. It is felt that these options might be particularly appealing to certain students with definite vocational interests. Also, an appropriately chosen option would greatly facilitate moving into a Master of Business Administration program in graduate school or law school.

Students enrolling in the Bachelor of Science program in Economics may select from the following options.

Accounting[7]

ACCT 301 Inter. Accounting	3 (3,0)
ACCT 302 Inter. Accounting	3 (3,0)
ACCT 303 Cost Accounting	3 (3,0)
and ACCT 404 Individual Taxation	3 (3,0)
or ACCT 411 Advanced Acct.	3 (3,0)
and ACCT 415 Auditing	3 (3,0)
LAW 313 Commercial Law	3 (3,0)
	15

Computer Science

CPSC 130 Data Processing with Cobol	3 (3,0)
CPSC 210 Programming Meth.	3 (3,0)
MGT 299 Computer Utilization I	1 (0,3)
MGT 418 Management Inform. Sys.	3 (3,0)
and MGT 499 Comp. Util. II	1 (1,0)
or ECON (MASC) 311 Intro. to Economet.	3 (3,0)
Computer Science Requirement[10]	6
	16-17

Environmental Studies

AGEC 403 Land Economics	3 (3,0)
BOT 145 Environmental Dynamics	2 (2,0)
CRD 357 Nat. Res. Economics	3 (3,0)
ENSC 471 Man and His Environ.	2 (2,0)
ENSC 472 Environ. Plan. and Cont.	2 (2,0)
FOR 304 Forest Economics	3 (3,0)
	15

Social Science

HIST 306 Amer. Econ. Develop	3 (3,0)
POSC 321 Gen. Public Admin.	3 (3,0)
or POSC 361 Inter. Politics	3 (3,0)
SOC 330 Industrial Sociology	3 (3,0)
Elective[5]	6
	15

Urban Studies

CRD (AGEC) 411 Regional Impact Analysis	2 (2,0)
ECON 421 Urban Economics	3 (3,0)
MGT 406 Location Economics	3 (3,0)
SOC (RS) 303 Methods of Social Research I	3 (3,0)
SOC 331 Urban Sociology	3 (3,0)
	14

Management Science

ACCT 303 Cost Accounting	3 (3,0)
or ACCT 404 Individual Taxation	3 (3,0)
or LAW 312 Commercial Law	3 (3,0)
ECON (MASC) 311 Intro. to Economet.	3 (3,0)
MASC 413 Management Sci. I	3 (3,0)
Quantitative Requirement[8]	6
	15

Mathematical Sciences—Statistics

ECON 430 Mathematical Economics	3 (3,0)
ECON (MASC) 311 Intro. to Econometrics	3 (3,0)
MTHSC 311 Linear Algebra	3 (3,0)
MTHSC 405 Stat. Theory and Meth. II	3 (3,0)
MTHSC 452 Linear Programming	3 (3,0)
	15

Public Administration[9]

POSC 302 State and Local Govt.	3 (3,0)
POSC 321 Gen. Public Admin.	3 (3,0)
POSC 422 Public Policy Analysis	3 (3,0)
POSC 423 Municipal Admin.	3 (3,0)
POSC 425 Grants and Govt. Bud. Proc.	3 (3,0)
	15

Textile Science

TEXT 122 Intro. to Textiles	2 (1,3)
TEXT 305 Basic Fibers	3 (3,0)
TEXT 306 Yarn Formation	3 (3,0)
TEXT 313 Fabric Formation	3 (3,0)
TEXT 314 Dyeing and Finishing	3 (3,0)
TEXT 475 Textile Marketing	3 (3,0)
	17

International Management[11]

MGT 301 Principles of Management	3 (3,0)
MGT 400 Mgt. of Org. Beh.	3 (3,0)
or MGT 415 Business Policy	3 (3,0)
POSC 361 International Politics	3 (3,0)
Modern Language[12]	8
	17

Marketing	
MKT 301 Principles of Marketing	3 (3,0)
MKT 402 Consumer Behavior	3 (3,0)
MKT 432 Quantitative Marketing Analysis	3 (3,0)
Marketing Elective[13]	6
	15

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Two courses totaling eight hours are required.
[3]The sequence of MTHSC 106, 207, 210, 301 may be replaced by MTHSC 102, 207, 210, 301 or 101, 102, 203 and 207.
[4]CPSC 110 should be selected for the Computer Science and Mathematical Sciences—Statistics options. CPSC 120 should be selected for the Management Science and Accounting options.
[5]Electives to be selected from 300- and 400-level courses in history, political science, psychology, and sociology.
[6]Twenty-four hours in economics above the sophomore level are required, including ECON 314 and 407. ECON 101 and 203 do not count toward the major. Major credit may include up to 6 hours selected from HIST 306, ECON (MASC) 311, ECON (MGT) 409, IE 484, MGT 406.
[7]Student in the Accounting option should select LAW 312 in lieu of LAW 322 in the junior year.
[8]To be selected from the following: ECON 430, ECON (MGT) 409, MASC 414, MTHSC 405.
[9]Students in the Public Administration option are required to take POSC 101 and 201; ECON 420 and 421 are to be included in the major.
[10]Select from CPSC 230 or any 300- and 400-level computer science courses.
[11]Students in the International Management option are required to take POSC 101, 201; ECON 412 is to be included in the major.
[12]FR 198 and 199, GER 198 and 199, SPAN 198 and 199.
[13]To be selected from the following: AGEC 351, MKT 423, 431, 450.

FINANCIAL MANAGEMENT

The degree program for the Bachelor of Science in Financial Management is accredited by the American Assembly of Collegiate Schools of Business. The curriculum provides the student with a course of study in preparation for a career in such areas as banking, insurance, brokerage and related activities. The student should be well prepared to serve on the financial staff of practically any business firm for the purpose of planning, providing, and controlling the capital of the firm. This curriculum should also prepare the student for service with government agencies and programs. The graduate with this degree should be adequately prepared for entrance in law or graduate school.

The coursework consists largely of courses in English, mathematics, accounting, economics, management, and the social sciences. The special interests of the individual student may be pursued through elective credit.

FRESHMAN YEAR

First Semester		Second Semester	
ECON 211 Principles of Economics	3 (3,0)	CPSC 120 Introduction to Information Processing Systems	3 (3,0)
ENGL 101 Composition I	3 (3,0)	ECON 212 Principles of Economics	3 (3,0)
MTHSC 102 Intro. to Math. Anal.[2]	3 (3,0)	ENGL 102 Composition II	3 (3,0)
POSC 101 American National Govt.	3 (3,0)	MTHSC 207 Multivariable Calculus[2]	3 (3,0)
SOC 201 Introduction to Sociology	3 (3,0)	PSYCH 201 Introduction to Psychology	3 (3,0)
Elective[3]	1	Elective[3]	1
	16		16

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3 (3,0)	ACCT 202 Principles of Accounting	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	MASC 310 Intro. to Mgt. Sci.	3 (3,0)
History Requirement	3	Literature Requirement[1]	3
Literature Requirement[1]	3	Elective[3]	6
Elective[3]	4		15
	16		

JUNIOR YEAR

ACCT 301 Intermediate Accounting	3 (3,0)	ACCT 302 Intermediate Accounting	3 (3,0)
ECON 302 Money and Banking	3 (3,0)	ACCT 303 Cost Accounting	3 (3,0)
ECON 314 Inter. Econ. Theory	3 (3,0)	or ACCT 307 Managerial Accounting	3 (3,0)
FIN 311 Financial Management I	3 (3,0)	ENGL 304 Business Writing	3 (3,0)
MGT 301 Principles of Management	3 (3,0)	FIN 308 Financial Institutions and Markets	3 (3,0)
LAW 312 Commercial Law	3 (3,0)	FIN 312 Financial Management II	3 (3,0)
	18	LAW 313 Commercial Law	3 (3,0)
			18

SENIOR YEAR

ACCT 404 Individual Taxation	3 (3,0)	FIN 404 Capital Structure	3 (3,0)
ENGL 301 Public Speaking	3 (3,0)	or FIN 408 Mgt. of Fin. Inst.	3 (3,0)
FIN 402 Asset Management	3 (3,0)	MGT 400 Mgt. of Org. Behav.	3 (3,0)
or FIN 406 Port. Mgt. and Theory	3 (3,0)	MGT 415 Business Policy	3 (3,0)
MGT 402 Prod. and Op. Mgt. I	3 (3,0)	Emphasis Area[4]	6
MKT 301 Principles of Marketing	3 (3,0)		15
Emphasis Area[4]	3		
	18		

132 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209 or a modern foreign language literature at the 300 or higher level.

[2]Credits earned in MTHSC 106 and 108 may be substituted for MTHSC 102 and 207, respectively, and 1 or 2 elective hours.

[3]Nine elective credits must be in nonbusiness areas. (Elective hours may be taken in any combination of one-, two-, three- or four-hour courses.)

[4]Nine Emphasis Area credits must be completed from the following: (1) any 300- or 400-level courses offered by the Department of Finance and/or School of Accountancy (except ACCT 303, 307, and FIN 306), and/or (2) any designated course except CPSC 110, and/or (3) E&CE 470, ECON 412, 430, ECON (MASC) 311, MASC 413, 414.

Note:

Financial Management majors are required to have a grade-point ratio of at least 2.0 in all FIN designated courses in order to graduate.

MTHSC 101, 105 and ENGL 100 may not be used as elective credit toward requirements for graduation with a BS in Financial Management.

INDUSTRIAL MANAGEMENT

This curriculum is designed to adequately prepare students for positions of major management responsibility in the technologically oriented industries. The program is accredited by the American Collegiate Schools of Business. Graduates are sought for positions as projects directors by various government agencies and have successfully filled a wide variety of positions in industry and government research centers. Banks and financial institutions also utilize the Industrial Management graduate in a liaison role as between them and their technologically oriented business customers. The degree offers an unexcelled background for those interested in careers as technical sales representatives.

During the first year, education in the mathematical and physical sciences is emphasized. In the second, third, and senior years, the student's work expands into the areas of industrial engineering, financial management, and the social sciences.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 102 General Chemistry	4 (3,3)
EG 109 Engineering Graphics	2 (1,3)	CPSC 120 Intro. to Infor. Proc. Sys.	3 (3,0)
ENGL 101 Composition I	3 (3,0)	ECON 211 Principles of Economics	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	ENGL 102 Composition II	3 (3,0)
History Requirement	3	MTHSC 108 Cal. of One Var. II	4 (4,0)
	16		17

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3 (3,0)	ACCT 202 Principles of Accounting	3 (3,0)
ECON 212 Principles of Economics	3 (3,0)	ECON 314 Inter. Econ. Theory	3 (3,0)
ENGR 220 Tech. in Mod. World	3 (3,0)	MGT 299 Computer Utilization I	1 (0,3)
MTHSC 210 Applied Matrix Alg.	3 (3,0)	MGT 304 Stat. Quality Control	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	Literature Requirement[1]	3
PSYCH 201 Intro. to Psychology	3 (3,0)	Elective	3
	18		16

JUNIOR YEAR

ACCT 307 Managerial Accounting	3 (3,0)	ECON 407 National Income and Employ. Anal.	3 (3,0)
ECON (MASC) 311 Intro. to Econometrics	3 (3,0)	FIN 306 Corporation Finance	3 (3,0)
ENGL 304 Business Writing	3 (3,0)	MASC 413 Management Science I	3 (3,0)
LAW 322 Legal Environ. of Business	3 (3,0)	MKT 301 Principles of Marketing	3 (3,0)
MGT 301 Principles of Management	3 (3,0)	Area Concentration/Technical Requirement[2]	3
Elective	3	Elective	3
	18		18

SENIOR YEAR

ENGL 301 Public Speaking	3 (3,0)	MGT 408 Prod. and Op. Mgt. II	3 (3,0)
MASC 414 Statistical Analysis	3 (3,0)	MGT 415 Business Policy	3 (3,0)
MGT 400 Mgt. of Org. Behav.	3 (3,0)	MGT 418 Mgt. Infor. Sys.	3 (3,0)
MGT 402 Prod. and Op. Mgt. I	3 (3,0)	MGT 499 Computer Utilization II	1 (1,0)
MGT 407 Directed Research	1 (1,0)	Area Concentration/Technical Requirement[2]	3
Area Concentration/Technical Requirement[2]	3	Elective	3
	16		16

135 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]The student is encouraged to select an area concentration. He/she may, with the approval of the adviser, select instead nine credits from an approved technical requirement list.

AREA CONCENTRATIONS

During the junior and senior years, students are encouraged to select from one of the following areas for the purpose of emphasizing a particular phase of the curriculum. (Computer programming and application are stressed in all upper division courses): Biological Sciences, Ceramics, Defense Studies, Economics, Environmental Science, Health and Hospital Administration, Human Resources, Industrial Engineering, Industrial Statistics, Management Science, Marketing Analysis, Regional Science, and Textiles.

TEXTILE CHEMISTRY, TEXTILE SCIENCE, AND TEXTILE TECHNOLOGY PROGRAMS

The textile student studies the production of fibers by man and nature, the processes for converting these fibers into a textile structure, the science of the addition of coloring agents and finishes to improve the desirability, and the test methods for evaluating the performance of textile products.

Graduates of the School of Textiles hold jobs with responsibilities in corporate management, sales, manufacturing management, design, research, development, technical service, quality control, and personnel management. They create new products and processes and solve problems. They create styles, patterns, textures, and colors for apparel, home, and industrial use as well as special application. They deal with

computers, automation, product quality, plant performance, environmental control, and consumer safety.

The textile industry has a continuing need for technically trained men and women to help it meet sociologically desirable standards such as those required by the Occupational Safety and Health Act, the Consumer Product Safety Commission, and the Environmental Protection Agency. In addition, there is a need to reduce costs and increase exports, and to develop new fibers and fabrics to satisfy the whims of fashion.

In the textile curricula a broad background is stressed, with as much as two-thirds of the courses coming from the large resources of the University outside the School of Textiles. In addition, the 34 hours of electives permit the student to gain expertise in related fields.

The School of Textiles offers three undergraduate degrees which differ in the content of science and business courses. The BS in Textile Chemistry and the BS in Textile Science are both based on the three sciences: chemistry, physics, and mathematics. With this firm base, the graduate is able to apply scientific knowledge to the solution of problems involving both chemical and physical principles. The graduate will be concerned with the conception, design, construction, and management of complete systems of labor, machinery and processes for the most efficient production of textiles or related chemicals. These two courses differ in that Textile Chemistry has a greater emphasis on chemistry and Textile Science has greater emphasis on yarn and fabric formation. Both curricula prepare one for graduate study in textiles.

The Bachelor of Textile Technology program has as its core the desirable business and humanistic courses in economics, management, sociology, and pyschology that prepare the graduate to begin a career as a production manager with a textile manufacturing firm. It is less well adapted to train one for graduate work, but with proper choice of electives a student can prepare himself for graduate school in certain areas.

The School of Textiles also offers advanced degrees as follows: Master of Science in Textile Chemistry, Master of Science in Textile Science, Doctor of Philosophy in Textile and Polymer Science, and in cooperation with the Chemistry Department, the Doctor of Philosophy in Chemistry with a major in Textile Chemistry.

Textile courses also may be taken as a minor area or as free electives. Recommended groups of courses may consist of 3, 6, 12, or 20 credits.

BASIC FRESHMAN YEAR FOR TEXTILE CHEMISTRY AND TEXTILE SCIENCE PROGRAMS

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry[1]	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
TEXT 122 Introduction to Textiles	2 (1,3)	PHYS 122 Phys. with Cal. I	3 (3,0)
History Elective[2]	3	Elective	2
Elective	1		16
	17		

[1]Textile Science majors substitute CH 102.
[2]To be selected from the following: HIST 101, 102, 172, 173.

TEXTILE CHEMISTRY

See page 89 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
CH 223 Organic Chemistry	3 (3,0)	CH 224 Organic Chemistry	3 (3,0)
CH 227 Org. Chem. Lab[2]	1 (0,3)	CH 228 Organic Chemistry Lab.[2]	1 (0,3)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	PHYS 222 Phys. with Cal. III	3 (3,0)
PHYS 223 Physics Lab. I	1 (0,3)	PHYS 224 Physics Lab. II	1 (0,3)
Literature Requirement[1]	3	Elective	4
Elective	2		16
	17		

JUNIOR YEAR

CH 331 Physical Chemistry	3 (3,0)	CH 332 Physical Chemistry	3 (3,0)
ECON 200 Economic Concepts	3 (3,0)	ENGL 304 Business Writing	3 (3,0)
TC 315 Introduction to Polymer Science and Engineering	3 (3,0)	TC 316 Chem. Prep. of Text.	3 (2,3)
TC 317 Polymer and Fiber Lab.	1 (0,3)	TEXT 306 Yarn Formation	3 (3,0)
Elective[3]	6	Elective[3]	6
	16		18

SENIOR YEAR

TC 457 Dyeing and Finishing I	3 (3,0)	TC 458 Dyeing and Finishing II	3 (3,0)
TC 459 Dyeing and Fin. Lab. I	1 (0,3)	TC 460 Dyeing and Fin. Lab. II	1 (0,3)
TEXT 313 Fabric Formation	3 (3,0)	TEXT 322 Prop. of Textile Struc.	3 (2,2)
TEXT 321 Fiber Science	3 (2,2)	Elective[3]	9
Elective[3]	6		16
	16		

132 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2]CH 225 and 226 may be selected.

[3]Class advisers have lists of approved electives and will suggest sequences of courses.

TEXTILE SCIENCE

See page 89 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	ECON 200 Economic Concepts	3 (3,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
PHYS 223 Physics Lab. I	1 (0,3)	PHYS 222 Phys. with Cal. III	3 (3,0)
TC 303 Textile Chemistry	3 (3,0)	PHYS 224 Physics Lab. II	1 (0,3)
TC 305 Textile Chemistry Lab	1 (0,3)	TC 304 Textile Chemistry	3 (3,0)
Literature Requirement[1]	3	TC 306 Textile Chemistry Lab.	1 (0,3)
Elective	1	Elective	1
	16		16

JUNIOR YEAR

TEXT 301 Fiber Processing I	3 (2,2)	ENGL 314 Technical Writing	3 (3,0)
TEXT 311 Fabric Development I	3 (2,2)	TEXT 302 Fiber Processing II	3 (2,2)
TEXT 321 Fiber Science	3 (2,2)	TEXT 312 Fabric Development II	3 (2,2)
Elective[2]	8	TEXT 322 Properties of Textile Structures	3 (2,2)
	17	Elective	6
			18

SENIOR YEAR

TC 315 Introduction to Polymer Science and Engineering	3 (3,0)	TC 457 Dyeing and Finishing I	3 (3,0)
TC 317 Polymer and Fiber Lab.	1 (0,3)	TC 459 Dyeing and Fin. Lab. I	1 (0,3)
TEXT 403 Fiber Processing III	3 (2,2)	TEXT 414 Nonwoven and Knitted Structures	3 (3,0)
TEXT 411 Fabric Development III	3 (2,2)	Elective[2]	9
Elective[2]	6		16
	16		

132 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Advisers have lists of approved electives and will suggest sequences of courses.

TEXTILE TECHNOLOGY

FRESHMAN YEAR

First Semester		Second Semester	
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 102 Intro. to Math. Anal.	3 (3,0)	MTHSC 101 Finite Probability	3 (3,0)
TEXT 122 Introduction to Textiles	2 (1,3)	SOC 201 Intro. to Sociology	3 (3,0)
Basic Science[2]	4 (3,3)	Basic Science[2]	4 (3,3)
History Elective[3]	3 (3,0)	Elective	3
Elective	1		16
	16		

SOPHOMORE YEAR

ACCT 200 Basic Accounting	3 (3,0)	ECON 200 Economic Concepts	3 (3,0)
MTHSC 203 Elem. Stat. Inference	3 (3,0)	PSYCH 201 Intro. to Psychology	3 (3,0)
TEXT 301 Fiber Processing I	3 (2,2)	TEXT 302 Fiber Processing II	3 (2,2)
TEXT 305 Basic Fibers	3 (3,0)	TEXT 324 Textile Statistics	3 (3,0)
Literature Requirement[1]	3	Elective	3
Elective	1		15
	16		

JUNIOR YEAR

ECON 301 Economics of Labor	3 (3,0)	MGT 307 Personnel Management	3 (3,0)
TEXT 311 Fabric Development I	3 (2,2)	LAW 312 Commercial Law	3 (3,0)
TEXT 403 Fiber Processing III	3 (2,2)	TEXT 312 Fabric Development II	3 (2,2)
Elective[4]	6	Elective[4]	6
	15		15

SENIOR YEAR

MGT 402 Prod. and Operations Management I	3 (3,0)	TEXT 322 Prop. of Text. Struc.	3 (2,2)
TEXT 314 Dyeing and Finishing	3 (3,0)	TEXT 414 Nonwoven and Knitted Structures	3 (3,0)
TEXT 321 Fiber Science	3 (2,2)	TEXT 428 Textile Research	3
TEXT 411 Fabric Development III	3 (2,2)	TEXT 475 Textile Marketing	3 (3,0)
Elective[4]	6	Elective[4]	5
	18		17

128 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]To be selected from the following; CH 101, 102, PHYS 207, 208.
[3]To be selected from the following: HIST 101, 102, 172, 173.
[4]Advisers have lists of approved electives and will suggest sequences of courses.

COLLEGE OF EDUCATION

The purpose of the College of Education is to prepare teachers, special services personnel, and school leaders; to provide professional services to education in South Carolina; and to carry out basic and applied research in education. Curricula are organized to give students the opportunities to (1) acquire a broad general education through liberal arts and science courses; (2) develop depth of knowledge in the teaching area; (3) gain an understanding of the historical, philosophical and psychological backgrounds of American education; and (4) acquire knowledge of and skill and experience in using effective teaching techniques.

Curricula for those preparing to teach have been especially designed by committees from each department offering a teaching major and the College of Education.

ADMISSION

Admission to programs in the College of Education is accomplished in three phases: preprofessional, professional, and directed teaching.

Preprofessional Individuals who show an interest in teaching and related areas and who have met the general admission requirements of Clemson University must complete and submit form CED03 to be considered for admission to a preprofessional program.

Professional During the term in which a student is to complete 60 semester hours of work, he/she must have a minimum cumulative grade-point ratio of 1.8, successfully complete the Basic Skills Education Entrance Examination (EEE), and apply on form CED03 for admission to a professional program in the College of Education. This application is to be submitted to the department head by November 10, March 1, or at the beginning of the summer school term in which the student will have completed 60 semester hours. A student who has not passed the EEE may be conditionally admitted to a teacher education program for a period not to exceed one year. Students will be allowed to take the examination no more than three times. Students who have completed 60 or more hours and have a cumulative grade-point ratio of 1.8 or higher as of January 1, 1983, will not be required to pass the EEE.

Directed Teaching A student who is in a professional program and who has completed at least 95 semester hours is eligible to register for the appropriate directed teaching program. A student should apply to the head of his/her department prior to May 1 of the academic year preceding the school year in which directed teaching is to be scheduled. The cumulative grade-point average necessary for graduation is required prior to being permitted to register for directed teaching and the related methods courses.

CONTINUING ENROLLMENT

A student must maintain the grade-point average for admission to the program and that required by Clemson University for continuing enrollment. Grade-point ratio may be checked at the end of a semester or

summer term. A student must have a cumulative grade-point ratio of 1.8 to enroll in 300-level and 2.0 to enroll in 400-level education courses.

Any student who desires to enroll in education courses must meet the cumulative grade-point requirements established for Education majors.

A student who is denied admission may appeal to the College of Education Admissions Committee.

A comprehensive statement of the activities, services, and programs of the College of Education is published in the *Student Handbook,* which is distributed by faculty advisers to Education majors and students interested in education.

GRADUATE STUDY

The College of Education offers programs leading to the Master of Agricultural Education, Master of Education, Master of Industrial Education, Specialist in Education, and Doctor of Education degrees.

BACHELOR OF ARTS CURRICULA

EARLY CHILDHOOD EDUCATION AND ELEMENTARY EDUCATION PROGRAMS

A total of 134 semester hours is required for the Bachelor of Arts degree in either the Early Childhood Education or the Elementary Education curriculum. The Early Childhood Education curriculum prepares the student for teaching positions in kindergarten or grades one through three. The Elementary Education curriculum prepares the student for teaching on the elementary school level.

EARLY CHILDHOOD EDUCATION

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
MTHSC 115 Contemporary Math. for the Elem. School Teacher I	3 (3,0)	MTHSC 116 Contemporary Math. for the Elem. School Teacher II	3 (3,0)
Foreign Language[5]	4 (3,1)	Foreign Language[5]	4 (3,1)
Science[2]	4	Science[2]	4
	15		17

SOPHOMORE YEAR

HIST 173 Western Civilization	3 (3,0)	ED 301 Principles of American Ed.	3 (3,0)
MTHSC 216 Geometry for Elementary School Teachers	3 (3,0)	ED 334 Child Growth and Dev.	3 (3,0)
Foreign Language[5]	3 (3,0)	MUS 210 Music Appreciation	3 (3,0)
Literature Requirement[1]	3	Foreign Language[5]	3 (3,0)
Science[2]	4	Literature Requirement[1]	3
	16	Elective	3
			18

JUNIOR YEAR

CAAH 303 Evol. of Vis. Arts I or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 483 Methods and Materials for Early Childhood Education	3 (2,3)
ED 302 Educational Psychology	3 (3,0)	ED 488 Teaching the Language Arts in the Elementary School	3 (2,3)
ED 461 Teaching Reading in the Elementary School	3 (2,3)	INED 372 Arts and Crafts	3 (2,3)
ED 466 Intro. to Early Child. Ed.	3 (3,0)	MUS 400 Music in the Elementary School Classroom	3 (3,0)
ED 471 The Exceptional Child	3 (3,0)	Social Science Elective[3]	3
ENGL 385 Children's Literature	3 (3,0)	Elective	2
	18		17

SENIOR YEAR

(Block Schedule—Either Semester)

ED 321 Phys. Ed. for Elem. School	3 (2,3)	ED 462 Diagnostic and Corrective Reading	3 (2,3)
ED 336 Behavior of the Preschool Child	3 (2,3)	ED 484 Directed Teaching in Early Childhood Education[4]	12 (1,33)
ED 458 Health Education	3 (3,0)		15
Social Science Elective[3]	3		
Elective	6		
	18		

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]A total of 12 semester hours composed of both biological and physical sciences, including appropriate laboratories, is required.
[3]Anthropology, economics, geography, philosophy, political science, psychology, religion, and sociology.
[4]Block schedule must be taken as shown in either semester of the senior year.
[5]Two years of the same language are required.

ELEMENTARY EDUCATION

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
MTHSC 115 Contemporary Math. for Elem. School Teachers I	3 (3,0)	MTHSC 116 Contemporary Math. for Elem. School Teachers II	3 (3,0)
Foreign Language[5]	4 (3,1)	Foreign Language[5]	4 (3,1)
Science[2]	4	Science[2]	4
	15		17

SOPHOMORE YEAR

HIST 173 Western Civilization	3 (3,0)	ED 301 Principles of American Ed.	3 (3,0)
MTHSC 216 Geometry for Elementary School Teachers	3 (3,0)	ED 334 Child Growth and Dev.	3 (3,0)
Foreign Language[5]	3 (3,0)	MUS 210 Music Appreciation	3 (3,0)
Literature Requirement[1]	3	Foreign Language[5]	3 (3,0)
Science[2]	4	Literature Requirement[1]	3
	16	Social Science Elective[3]	3
			18

JUNIOR YEAR

CAAH 303 Evol. of Vis. Art I or CAAH 304 Evol. of Vis. Art II	3 (3,0)	ED 461 Teaching Reading in the Elementary School	3 (2,3)
ED 302 Educational Psychology	3 (3,0)	ED 485 Meth. and Curriculum in Elem. Math. and Science	3 (2,3)
ED 471 The Exceptional Child	3 (3,0)	ED 487 Teaching Social Studies in the Elementary School	2 (1,3)
ENGL 385 Children's Literature	3 (3,0)	ED 488 Teaching Language Arts in the Elementary School	3 (2,3)
INED 372 Arts and Crafts	3 (2,3)	Elective	6
Elective	3		17
	18		

SENIOR YEAR

(Block Schedule—Either Semester)

ED 321 Phys. Ed. for Elem. School	3 (2,3)	ED 462 Diagnostic and Corrective Reading	3 (2,3)
ED 458 Health Education	3 (3,0)	ED 481 Directed Teaching[4]	12 (1,33)
MUS 400 Music in the Elementary School Classroom	3 (3,0)		15
Social Science Elective[3]	3		
Elective	6		
	18		

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]A total of 12 semester hours composed of both biological and physical sciences, including appropriate laboratories, is required.
[3]Anthropology, economics, geography, philosophy, political science, psychology, religion, and sociology.
[4]Block schedule must be taken as shown in either semester of the senior year
[5]Two years of the same language are required.

SECONDARY EDUCATION CURRICULA

Programs leading to a Bachelor of Arts degree in Secondary Education are available to students preparing to teach economics, English, history, mathematical sciences, French, German, Spanish, natural sciences, political science, psychology, or sociology on the secondary school level. The teaching field should be selected as early as possible in order that appropriate freshman and sophomore courses may be taken.

Each curriculum requires a major concentration in the teaching field. Specific courses and sequences have been designated by teacher education committees to meet requirements for those planning to teach. Students who have elective courses in the teaching area should consult the departmental adviser prior to scheduling these courses.

The professional education courses should be completed in sequence prior to registering for the block schedule. Application to Directed Teaching (ED 412) should be made in writing no later than May 1 preceding the school year in which student teaching is to be scheduled. A student whose cumulative grade-point is lower than the requirement for graduation will not be permitted to register for Directed Teaching.

Education 412 is conducted on a full-day basis, "block schedule," for one semester. Students taking ED 412 will register for ED 424 and 498, these courses being taught on a five-day basis during the first portion of the semester.

TEACHING AREA: ECONOMICS

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	MTHSC 102 Intro. To Math. Anal.	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	Foreign Language[5]	4 (3,1)
Foreign Language[5]	4 (3,1)	Science[2]	4
Science[2]	4		17
	18		

SOPHOMORE YEAR

ECON 211 Principles of Economics	3 (3,0)	ACCT 200 Basic Accounting	3 (3,0)
MTHSC 203 Elem. Stat. Inference	3 (3,0)	or ACCT 201 Prin. of Acct.	3 (3,0)
Foreign Language[5]	3 (3,0)	ECON 212 Principles of Economics	3 (3,0)
Literature Requirement[1]	3	ED 301 Principles of American Ed.	3 (3,0)
Science[2]	4	Foreign Language[5]	3 (3,0)
	16	Literature Requirement[1]	3
		Elective[3]	3
			18

JUNIOR YEAR

ED 302 Educational Psychology	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
ED 335 Adol. Growth and Dev.	3 (3,0)	Teaching Major[4]	9
Teaching Major[4]	9	Elective[3]	6
	15		18

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching	12 (1,33)
ED 458 Health Education	3 (3,0)	ED 424 Methods and Materials in Secondary School Instruction	3 (3,0)
MUS 210 or 311 Music Apprec.	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
Teaching Major[4]	6		
Elective[3]	1		
	16		18

136 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]A total of 12 semester hours composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the semester hours must be in a two-semester sequence.
[3]This program enables the student to meet the requirements for certification by the South Carolina State Department of Education in Economics. If certification in social studies is desired, the student should see his adviser prior to selecting free electives.
[4]The teaching major consists of 24 semester hours of junior and senior (300 and 400) level courses. The student must select courses with the consent of his major adviser. These include ECON 314, 407, plus an additional 18 hours in economics.
[5]Four semesters of the same language are required.

TEACHING AREA: ENGLISH

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Oreintation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	MTHSC 102 Intro. to Math. Anal.	3 (3,0)
Foreign Language[6]	4 (3,1)	Foreign Language[6]	4 (3,1)
Science[2]	4	Science[2]	4
Elective	1	Elective	1
	16		18

SOPHOMORE YEAR

ED 301 Principles of Amer. Ed.	3 (3,0)	ED 302 Educational Psychology	3 (3,0)
HIST 173 Western Civilization	3 (3,0)	Foreign Language[6]	3 (3,0)
Foreign Language[6]	3 (3,0)	Literature Requirement[1]	3
Literature Requirement[1]	3	Social Science Elective[3]	3
Science[2]	4	Elective	4
	16		16

JUNIOR YEAR

ED 335 Adol. Growth and Dev.	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
HIST 361 History of England	3 (3,0)	Social Science Elective[3]	3
Teaching Major[5]	9	Teaching Major[5]	9
Elective	3	Elective	3
	18		18

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching[4]	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in Secondary School Instruction	3 (3,0)
ED 458 Health Education	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
MUS 210 or 311 Music Apprec.	3 (3,0)		
Teaching Major[5]	6		
	15		18

135 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]A total of 12 semester hours composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the semester hours must be in a two-semester sequence.
[3]Anthropology, geography, philosophy, political science, psychology, religion, sociology.

[4]This is a block semester and must be taken as listed.
[5]The Teaching Major requires 24 semester hours of junior and senior English courses and must include ENGL 304, 386, 400, 401, 405, or 406, 411, 422, or 423, 435. Those receiving Departmental certification for ENGL 304 are required to complete ENGL 485.
[6]Four semesters of the same language are required.

TEACHING AREA: HISTORY

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	MTHSC 102 Intro. to Math. Anal.	3 (3,0)
Foreign Language[6]	4 (3,1)	Foreign Language[6]	4 (3,1)
Science[2]	4	Science[2]	4
Elective[4]	2		
	17		17

SOPHOMORE YEAR

HIST 173 Western Civilization	3 (3,0)	ED 301 Principles of American Ed.	3 (3,0)
Foreign Language[6]	3 (3,0)	HIST 101 History of the U.S.	3 (3,0)
Literature Requirement[1]	3	Foreign Language[6]	3 (3,0)
Science[2]	4	Literature Requirement[1]	3
Elective[4]	3	Social Science Elective[3]	3
	16	Elective[4]	3
			18

JUNIOR YEAR

ED 302 Educational Psychology	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
ED 335 Adol. Growth and Dev.	3 (3,0)	Social Science Elective[3]	3
HIST 102 History of the U.S.	3 (3,0)	Teaching Major[5]	9
Teaching Major[5]	9	Elective	2
	18		17

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in	
ED 458 Health Education	3 (3,0)	Secondary School Instruction	3 (3,0)
MUS 210 or 311 Music Apprec.	3 (3,0)	ED 498 Secondary Content	
Teaching Major[5]	6	Area Reading	3 (1,4)
	15		18

136 Total Semester Hours

[1]To be selected from ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]A total of 12 semester hours composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the semester hours must be in a two-semester sequence.
[3]Anthropology, economics, geography, history, political science, psychology.
[4]This program enables the student to meet the requirements for certification by the South Carolina State Department of Education in history. If certification in social studies is desired, the student should see his adviser prior to selecting free electives.
[5]The Teaching Major consists of 24 semester hours of junior and senior (300- and 400-level) courses, at least 6 of which must be 400 level. Students must select courses with consent of major adviser.
[6]Four semesters of the same language are required.

TEACHING AREA: MATHEMATICAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	Foreign Language[5]	4 (3,1)
Foreign Language[5]	4 (3,1)	Elective	1
	16		16

SOPHOMORE YEAR

ED 302 Educational Psychology	3 (3,0)	CPSC 110 Elem. Comp. Prog.	3 (3,0)
MTHSC 206 Calculus of Sev. Var	4 (4,0)	ED 335 Adol. Growth and Dev.	3 (3,0)
Foreign Language[5]	3 (3,0)	Foreign Language[5]	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Science Elective[2]	3	Science Elective[2]	3
	16	Social Science Elective[3]	3
			18

JUNIOR YEAR

ED 301 Principles of American Ed.	3 (3,0)	CAAH 303 Evol. of Vis. Arts I	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	or CAAH 304 Evol. of Vis. Arts II	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
MTHSC 308 College Geometry	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
Social Science Elective[3]	3	MTHSC 311 Linear Algebra	3 (3,0)
Elective	3	MTHSC 408 Topics in Geometry	3 (3,0)
	18	Elective	3
			18

SENIOR YEAR

ED 458 Health Education	3 (3,0)	ED 412 Directed Teaching[4]	12 (1,33)
MTHSC 350 Intro. to Math. Models	3 (3,0)	ED 424 Methods and Materials in	
MTHSC 412 Intro. to Mod. Algebra	3 (3,0)	Secondary School Instruction	3 (3,0)
MTHSC 453 Advanced Calculus I	3 (3,0)	ED 498 Secondary Content	
MUS 210 or 311 Music Apprec.	3 (3,0)	Area Reading	3 (1,4)
Elective	3		18
	18		

138 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Science electives to be taken in astronomy, chemistry, geology, or physics.
[3]Anthropology, geography, philosophy, political science, psychology, religion, sociology.
[4]This semester is a block schedule and must be taken as listed.
[5]Four semesters of the same language are required.
Note: Suggested mathematical sciences elective: CPSC 130, MTHSC 405, 409, 452, 454.

TEACHING AREA: MODERN LANGUAGES (French, German and Spanish)

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	MTHSC 102 Intro. to Math. Anal.	3 (3,0)
Foreign Language[6]	4 (3,1)	Foreign Language[6]	4 (3,1)
Science[2]	4	Science[2]	4
	15		17

SOPHOMORE YEAR

ED 301 Principles of American Ed.	3 (3,0)	ED 302 Educational Psychology	3 (3,0)
HIST 173 Western Civilization	3 (3,0)	Foreign Language[6]	3 (3,0)
Foreign Language[6]	3 (3,0)	Literature Requirement[1]	3
Literature Requirement[1]	3	Social Science Elective[3]	3
Science[2]	4	Elective	5
	16		17

JUNIOR YEAR

ED 335 Adol. Growth and Dev.	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
Teaching Major[4]	9	Teaching Major[4]	9
Social Science Elective[3]	3	Elective	4
Elective	3		16
	18		

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching[5]	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in Secondary School Instruction	3 (3,0)
ED 458 Health Education	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
MUS 210 or 311 Music Apprec.	3 (3,0)		
Teaching Major[4]	6		
Elective	3		
	18		18

135 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]A total of 12 semester hours composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the semester hours must be in a two-semester sequence.
[3]Anthropology, economics, geography, philosophy, political science, psychology, religion and sociology.
[4]The teaching major requires 24 semester hours in either French, German, or Spanish as listed.
French major must include FR 205 and 21 hours arranged as follows:
Group I Fifteen semester credits from FR 209, 301, 302, 305, 409
Group II Six semester credits from FR 403, 404, 405, 406, 407, 408, 498, 499
German major must include GER 205 and 21 semester hours arranged as follows:
Group I Fifteen semester hours from GER 301, 302, 305, 307, 412
Group II Six semester hours from GER 401, 402, 403, 411, 412, 413
Spanish major must include SPAN 205 and 21 hours arranged as follows:
Group I Six semester credits from SPAN 303, 304, 311 (preferably in sequence)
Group II Nine semester credits from SPAN 305, 307, 308, 409
Group III Six semester credits from SPAN 401, 402, 409, 422, 435, 440, 498, 499
[5]This semester is a block schedule and must be taken as listed.
[6]Four semesters of the same language are required.

TEACHING AREA: NATURAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 102 or 112 General Chemistry	4 (3,3)
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 102 Intro. to Math. Anal.	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	Foreign Language[5]	4 (3,1)
Foreign Language[5]	4 (3,1)	Elective	1
Elective	1		15
	16		

SOPHOMORE YEAR

BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
ED 302 Educational Psychology	3 (3,0)	ED 335 Adol. Growth and Dev.	3 (3,0)
MTHSC 203 Elem. Stat. Inference	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
Foreign Language[5]	3 (3,0)	Foreign Language[5]	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Elective	2	Elective	1
	18		17

JUNIOR YEAR

ED 301 Principles of American Ed.	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
GEOL 101 Physical Geology	4 (3,2)	GEOL 102 Historical Geology	4 (3,3)
HIST 173 Western Civilization	3 (3,0)	PHYS 208 General Physics II	4 (3,2)
PHYS 207 General Physics I	4 (3,2)	Social Science Elective[3]	3
Science Elective[2]	3	Elective	3
	17		17

SENIOR YEAR

(Block Schedule—Either Semester)

ASTR 102 Stellar Astronomy	3 (3,0)	ED 412 Directed Teaching[4]	12 (1,33)
CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 424 Methods and Materials in	
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	Secondary School Instruction	3 (3,0)
ED 458 Health Education	3 (3,0)	ED 498 Secondary Content	
MUS 210 or 311 Music Apprec.	3 (3,0)	Area Reading	3 (1,4)
Social Science Elective[3]	3		18
Elective	3		
	18		

136 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Science electives to be taken in biological sciences, chemistry, physics, geology.
[3]Anthropology, economics, geography, philosophy, political science, psychology, religion, sociology.
[4]The last semester of the senior year is a block schedule and must be taken as listed.
[5]Four semester of the same language are required.

TEACHING AREA: POLITICAL SCIENCE

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	MTHSC 102 Intro. to Math. Anal.	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	Foreign Language[5]	4 (3,1)
Foreign Language[5]	4 (3,1)	Science[2]	4
Science[2]	4		17
	18		

SOPHOMORE YEAR

HIST 101 History of the U.S.	3 (3,0)	ED 301 Principles of Amer. Ed.	3 (3,0)
POSC 101 Amer. Nat. Govt.	3 (3,0)	HIST 102 History of the U.S.	3 (3,0)
Foreign Language[5]	3 (3,0)	POSC 201 Intro. to Pol. Sci.	3 (3,0)
Literature Requirement[1]	3	Foreign Language[5]	3 (3,0)
Science[2]	4	Literature Requirement[1]	3
	16	Elective[3]	3
			18

JUNIOR YEAR

ED 302 Education Psychology	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
ED 335 Adol. Growth and Dev.	3 (3,0)	Teaching Major[4]	9
Teaching Major[4]	9	Elective[3]	6
Elective[3]	1		18
	16		

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in	
ED 458 Health	3 (3,0)	Secondary School Instruction	3 (3,0)
MUS 210 or 311 Music Apprec.	3 (3,0)	ED 498 Secondary Content	
Teaching Major[4]	6	Area Reading	3 (1,4)
	15		18

136 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]A total of 12 semester hours composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the semester hours must be in a two-semester sequence.
[3]This program enables the student to meet the requirements for certification by the South Carolina State Department of Education in political science. If certification in social studies is desired, the student should see his adviser prior to selecting free electives.
[4]The Teaching Major requires 24 semester hours of junior- and senior-level political science courses. The hours are to be drawn from four of the following fields:
American Government—POSC 302 (required) 403, 405, 409

Comparative Governments—POSC 371, 372, 475, 476
International Relations—POSC 361, 462, 463, 465
Political Behavior—POSC 442, 443, 454
Political Thought—POSC 351, 352, 453, 482
Public Administration—POSC 321, 422, 423, 424, 425, 427, 428
Public Law—POSC 432, 433, 434, 435
[5]Four semesters of the same language are required.

TEACHING AREA: PSYCHOLOGY

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	MTHSC 102 Intro. to Math. Anal.	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	Foreign Language[5]	4 (3,1)
Foreign Language[5]	4 (3,1)	Science Elective[2]	4
Science Elective[2]	4		17
	18		

SOPHOMORE YEAR

MTHSC 203 Elem. Stat. Inference	3 (3,0)	ED 301 Principles of American Ed.	3 (3,0)
PSYCH 201 Intro. to Psychology	3 (3,0)	PSYCH 210 Intro. Exp. Psych.	3 (3,0)
Foreign Language[5]	3 (3,0)	Foreign Language[5]	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3 (3,0)
Science Elective[2]	4	Elective[3]	4
	16		16

JUNIOR YEAR

ED 302 Education Psychology	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
ED 335 Adol. Growth and Dev.	3 (3,0)	Teaching Major[4]	9
Teaching Major[4]	9	Elective[3]	3
Elective	3		15
	18		

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in Secondary School Instruction	3 (3,0)
ED 458 Health Education	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
MUS 210 or 311 Music Appreciation	3 (3,0)		
Teaching Major[4]	6		
	15		18

133 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]A total of 12 semester hours composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the semester hours must be in a two-semester sequence.
[3]This program enables the student to meet the requirements for certification by the South Carolina State Department of Education in psychology. If certification in social studies is desired, the student should see his adviser prior to selecting free electives.
[4]The Teaching Major consists of 24 semester hours of junior and senior (300 and 400 level) courses. Students must select courses with the consent of his major adviser.
[5]Four semesters of the same language are required.

TEACHING AREA: SOCIOLOGY

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	MTHSC 102 Intro. to Math. Anal.	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	Foreign Language[6]	4 (3,1)
Foreign Language[6]	4 (3,1)	Science Elective[2]	4
Science Elective[2]	4		17
	18		

SOPHOMORE YEAR

MTHSC 203 Elem. Stat. Inference	3 (3,0)	ED 301 Principles of Amer. Ed.	3 (3,0)
SOC 201 Intro. to Sociology	3 (3,0)	SOC 202 Social Problems	3 (3,0)
Foreign Language[6]	3 (3,0)	Foreign Language[6]	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Science Elective[2]	4	Elective[3]	6
	16		18

JUNIOR YEAR

ED 302 Education Psychology	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
ED 335 Adol. Growth and Dev.	3 (3,0)	Social Science Elective[4]	3
Teaching Major[5]	9	Teaching Major[5]	9
Elective[3]	3	Elective[3]	1
	18		16

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in Secondary School Instruction	3 (3,0)
ED 458 Health Education	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
MUS 210 or 311 Music Apprec.	3 (3,0)		
Teaching Major[5]	6		
	15		18

136 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]A total of 12 semester hours composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the semester hours must be in a two-semester sequence.

[3]This program enables the student to meet the requirements for certification by the South Carolina State Department of Education in sociology. If certification in social studies is desired, the student should see his adviser prior to selecting free electives.

[4]Anthropology, economics, geography, history, political science, psychology.

[5]The Teaching Major consists of 24 hours of junior and senior (300 and 400 level) courses. Students must select courses with the consent of major adviser.

[6]Four semesters of the same language are required.

BACHELOR OF SCIENCE CURRICULA

AGRICULTURAL EDUCATION

The Agricultural Education curriculum is designed for students who wish to prepare for positions in vocational agriculture, agricultural occupations, and other teaching positions in the secondary schools; engage in other forms of educational work such as agricultural missionary, public relations and agricultural extension; farming, soil conservation and other governmental work; business and industry.

The curriculum provides for a broad education in general and professional education including student teaching. In addition to required courses giving a thorough background in the agricultural and biological sciences, a student may minor in *Business, International Agriculture,* or a *Second Department.* Students in other departments in the College of Agricultural Sciences may minor in Agricultural Education and be certified to teach if they meet all requirements.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro. to Animal Ind.	3 (2,3)	AGED 100 Orient. and Field Exper.	1 (0,2)
AGRIC 104 Intro. to Plant Sciences	3 (2,3)	BIOL 104 General Biology II	3 (3,0)
BIOL 103 General Biology I	3 (3,0)	BIOL 106 General Biology Lab. II	1 (0,3)
BIOL 105 General Biology Lab. I	1 (0,3)	CH 102 or 112 General Chemistry	4 (3,3)
CH 101 General Chemistry	4 (3,3)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 102 Intro. to Math. Anal.[2]	3 (3,0)
	17	Elective	1
			16

SOPHOMORE YEAR

AGEC 202 Agricultural Economics	3 (3,0)	AGM 206 Agric. Mechanization	3 (2,3)
AGED 201 Intro. to Agric. Ed.	3 (2,3)	AGRON 202 Soils	3 (2,2)
AGM 205 Principles of Farm Shop	3 (2,3)	ENGL 231 Intro. to Journalism	3 (3,0)
CPSC 120 Intro. to Infor. Proc. Sys.	3 (3,0)	or ENGL 301 Pub. Speaking	3 (3,0)
or PHYS 207 General Physics I	4 (3,2)	or ENGL 304 Business Writing	3 (3,0)
Literature Requirement[1]	3	FOR 305 Elements of Forestry	2 (2,0)
Elective	0-1	FOR 307 Elem. of Forestry Lab.	1 (0,3)
	16	Social Science Elective[3]	3
		Elective	1
			16

JUNIOR YEAR

AGEC 302 Econ. of Farm Mgt.	3 (2,3)	AGRON 452 Soil Fert. and Mgt.	3 (3,0)
AGM 301 Soil and Water Conserv.	3 (2,3)	or AGRON 301 Fertilizers	2 (2,0)
or AGM 452 Farm Power	3 (2,3)	ANSC 301 Feeds and Feeding	3 (2,3)
ENT 301 General Entomology	3 (2,3)	ED 302 Educational Psychology	3 (3,0)
Approved Agriculture Elective	3	Minor[4]	6
Minor[4]	6	Elective	1-2
	18		16

SENIOR YEAR

AGED 423 Curriculum	2 (2,0)	AGED 400 Supv. Field Exp. II	1 (0,3)
HORT 407 Landscape Design	3 (2,3)	AGED 401 Meth. in Agric. Ed.	3 (2,3)
PLPA 301 Plant Pathology	3 (2,2)	AGED 406 Directed Teaching	12 (0,36)
Minor[4]	3	AGED 425 Teaching Agric. Mech.	2 (1,3)
Elective	6		18
	17		

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematical sciences courses or electives in lieu of MTHSC 102. Students ineligible for MTHSC 102 will take MTHSC 105 as a substitute for MTHSC 102.

[3]To be selected from the following: HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, RS 301, RS (SOC) 401, SOC 201.

[4]See adviser for available minors and course requirements.

GRAPHIC COMMUNICATIONS

The Bachelor of Science degree in Graphic Communications is designed to prepare students for careers in printing, publishing, packaging, and related industries. The core curriculum assures the graduate of having the skills and knowledge required by most entry-level jobs. The approved electives provide each student the opportunity to select courses which enhance career preparation in specific segments of graphic communications. The nature of the coursework is heavily oriented around individual laboratory performance which stresses the development of problem solving skills in a broad cross section of printing production areas. Appli-

cations include all major processes and a variety of industry segments, including commercial printing, publishing, package production, specialty printing, and industrial applications of printing technology beyond communications. The most common career opportunities are in printing management, production planning and supervision, and both commercial and technical sales.

FRESHMAN YEAR

First Semester		Second Semester	
ENGL 101 Composition I	3 (3,0)	CPSC 110 Elem. Computer Prog. or CPSC 120 Intro. to Information Processing Systems	3 (3,0)
INED 101 Introduction to Industrial Ed.	1 (1,0)	ENGL 102 Composition II	3 (3,0)
INED 106 Drafting for Industrial Ed. I	3 (1,6)	GC 104 Graphic Arts I	3 (1,6)
MTHSC 105 Algebra and Trigonometry	5 (5,0)	INED 105 Machining Practices	3 (1,6)
Approved Lab. Science Requirement[3]	4	Approved Lab. Science Requirement[3]	4
Elective	1	Elective	1
	17		17

SOPHOMORE YEAR

ACCT 203 Financial Accounting	3 (3,0)	ACCT 307 Managerial Accounting	3 (3,0)
GC 304 Photographic Techniques	3 (1,6)	CPSC 130 Data Proc. with Cobol	3 (3,0)
MGT 200 Introduction to Business	3 (3,0)	GC 207 Graphic Arts II	3 (1,6)
PSYCH 201 Introduction to Psychology	3 (3,0)	PSYCH 364 Industrial Psychology	3 (3,0)
Literature Requirement[1]	3	Science Requirement	4
Approved Elective	1	Elective	2
Elective	1		18
	17		

SUMMER INTERNSHIP (TEN WEEKS)[2]

JUNIOR YEAR

ECON 200 Economic Concepts	3 (3,0)	ENGL 301 Public Speaking	3 (3,0)
GC 440 Adv. Lithographic Methods	4 (2,4)	GC 406 Problems in Specialty Printing	4 (2,6)
INED 208 Electricity	3 (2,3)	MGT 307 Personnel Management	3 (3,0)
INED 325 Ind. Org. and people	3 (3,0)	MKT 301 Principles of Marketing	3 (3,0)
POSC 302 State and Local Government	3 (3,0)	Humanities Requirement	3
	16		16

SUMMER INTERNSHIP (TEN WEEKS)[2]

SENIOR YEAR

GC 444 Current Developments and Trends in Graphic Communications	3 (2,3)	GC 448 Planning and Controlling Printing Functions	3 (3,0)
SH 301 Industrial Accident Prevention and Loss Control I	3 (3,0)	INED 496 Public Relations	3 (3,0)
Approved Elective	8	Approved Elective	8
Elective	3	Elective	3
	17		17

135 Total Semester Hours

[1]To be selected from ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Student is required to complete at least two work periods of ten or more weeks.
[3]Approved Laboratory Science Requirement: at least two from chemistry and/or physics. One may come from the biological sciences.

INDUSTRIAL EDUCATION

The curriculum in Industrial Education is designed to prepare students for careers in the teaching of industrial subjects and in training programs

in industry. To accomplish these purposes the curriculum is divided into three areas of specialization leading to the degree of Bachelor of Science in Industrial Education. At the end of the freshman year, each student will select one of three options: Education for Industry, Industrial Arts Education, or Vocational-Technical Education. Each option requires 135 semester hours of coursework.

EDUCATION FOR INDUSTRY OPTION

The Education for Industry option is designed to prepare students to enter industry as training specialists. Due to the expansion of technology and industrial development, there is a need for training specialists and training directors in industry.

FRESHMAN YEAR

First Semester		Second Semester	
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
INED 101 Intro. to Ind. Ed.	1 (1,0)	INED 108 Training Programs in Industry I	3 (3,0)
INED 106 Drafting for Ind. Ed. I	3 (1,6)	Science Requirement[2]	4
MTHSC 104 Trigonometry	2 (2,0)	Technical Specialty Requirement[3]	4
Science Requirement[2]	4	Elective	2
Technical Specialty Requirement[3]	3		16
Elective	1		
	17		

SOPHOMORE YEAR

SOC 201 Intro. to Sociology	3 (3,0)	ECON 211 Principles of Economics	3 (3,0)
Literature Requirement[1]	3	PSYCH 201 Intro. to Psychology	3 (3,0)
Science Requirement[2]	4	Technical Specialty Requirement[3]	6
Technical Specialty Requirement[3]	6	Approved Elective[3]	3
Elective	1	Elective	1
	17		16

JUNIOR YEAR

ECON 301 Economics of Labor	3 (3,0)	ENGL 301 Public Speaking	3 (3,0)
MGT 301 Principles of Management	3 (3,0)	MGT 307 Personnel Management	3 (3,0)
INED 325 Ind. Org. and People	3 (3,0)	PSYCH 364 Industrial Psychology	3 (3,0)
TEXT 460 Textile Processes	3 (3,0)	Technical Specialty Requirement[3]	3
Technical Specialty Requirement[3]	3	Approved Elective[3]	3
Approved Elective[3]	3	Elective	2
	18		17

SENIOR YEAR

INED 405 Course Org. and Eval.	3 (3,0)	INED 408 Training Programs in Industry II	3 (3,0)
INED 422 History and Philosophy of Industrial and Voc. Ed.	3 (3,0)	INED 496 Public Relations	3 (3,0)
SOC 330 Industrial Sociology	3 (3,0)	Approved Elective[3]	6
Technical Specialty Requirement[3]	2	Elective	5
Approved Elective[3]	3		17
Elective	3		
	17		

135 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]At least two fields must be represented with approval of adviser.
[3]Approved Elective and Technical Specialty Requirements to be approved by adviser.
Note: Electives should include 27 hours of Technical Specialty Electives, 18 hours of Approved Electives, and 16 hours of free Electives.

One summer (400 clock hours) of field experience is required of each student following the sophomore year.

INDUSTRIAL ARTS EDUCATION OPTION

The Industrial Arts Education option is for those students who desire to teach industrial arts in the secondary schools. Industrial arts is the subject area in the public school system which attempts to provide youth with an interpretation of American industry. It is a general education subject designed to give students exploratory experience in the classroom and laboratory. Majors in this option are qualified for full certification as secondary school teachers of industrial arts and prevocational education.

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	INED 103 Woodworking II	2 (1,3)
INED 101 Intro. to Ind. Ed.	1 (1,0)	INED 105 Machining Practices	3 (1,6)
INED 102 Woodworking I	2 (1,3)	INED 107 Drafting for Ind. Ed. II	3 (1,6)
INED 106 Drafting for Ind. Ed. I	3 (1,6)	Science Requirement[2]	4
MTHSC 104 Trigonmetry	2 (2,0)	Elective	1
Science Requirement[2]	4		16
Elective	1		
	17		

SOPHOMORE YEAR

INED 203 Basic Metal Processes	3 (1,6)	GC 104 Graphic Arts I	3 (1,6)
INED 205 Power Technology	3 (2,2)	INED 208 Electricity	3 (2,3)
Literature Requirement[1]	3	INED 313 Arts and Crafts	3 (1,6)
Science Requirement[2]	4	MUS 210 Music Appreciation	3 (3,0)
Social Science Requirement[3]	3	Social Science Requirement[3]	3
Elective	1	Elective	1
	17		16

JUNIOR YEAR

ED 302 Educational Psychology	3 (3,0)	ED 335 Adol. Growth and Dev.	3 (3,0)
INED 302 Dwelling Materials and Construction Methods	2 (1,2)	ED 458 Health Education	3 (3,0)
INED 414 Electronics for Teach.	3 (1,6)	ENGL 301 Public Speaking	3 (3,0)
TEXT 460 Textile Processes	3 (3,0)	INED 317 Mgt. of Ind. Ed. Labs	3 (2,2)
Social Science Requirement[3]	3	Social Science Requirement[3]	3
Elective	4	Elective	3
	18		18

SENIOR YEAR

CAAH 303 Evol. of Visual Arts I or CAAH 304 Evol. of Visual Arts II	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
INED 405 Course Org. and Eval.	3 (3,0)	INED 402 Directed Teaching	12 (0,36)
INED 422 Hist. and Phil. of Industrial and Vocational Ed.	3 (3,0)		15
INED 425 Teaching Industrial Subjects	3 (3,0)		
INED 441 Comp. Lab. in Industrial Ed.	3 (1,4)		
Elective	3		
	18		

135 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]To be selected from astronomy, biology, chemistry, geology, physics. At least two fields must be represented, one of which must be in the biological sciences.

[3]Anthropology, economics, geography, history, philosophy, political science, psychology, religion, sociology. At least two fields must be represented with six, but not more than six hours in one field.

VOCATIONAL-TECHNICAL EDUCATION OPTION

The Vocational-Technical Education option is designed to prepare teachers of vocational and technical subjects in the senior high schools, area vocational centers, and technical education centers. All elective courses in this option will be in an area of specialization or related fields. Teachers graduating from this option will possess the skills and knowledge required to teach the occupation or family of occupations in their area of specialization.

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	INED 105 Machining Practices	3 (1,6)
INED 101 Intro. to Ind. Ed.	1 (1,0)	INED 107 Drafting for Ind. Ed. II	3 (1,6)
INED 102 Woodworking I	2 (1,3)	Science Requirement[2]	4
INED 106 Drafting for Ind. Ed. I	3 (1,6)	Social Science Requirement[3]	3
MTHSC 104 Trigonometry	2 (2,0)	Elective	1
Science Requirement[2]	4		17
Elective	1		
	17		

SOPHOMORE YEAR

INED 203 Basic Metal Processes	3 (1,6)	ENGL 301 Public Speaking	3 (3,0)
INED 205 Power Technology	3 (2,2)	GC 104 Graphic Arts I	3 (1,6)
Literature Requirement[1]	3	INED 208 Electricity	3 (2,3)
Science Requirement[2]	4	MUS 210 Music Appreciation	3 (3,0)
Elective	1	Social Science Requirement[3]	3
	14	Elective	1
			16

SUMMER

INED 350 Industrial Cooperative Experience 6 (0,18)

JUNIOR YEAR

ED 302 Educational Psychology	3 (3,0)	CAAH 303 Evol. of Visual Arts I	3 (3,0)
ED 458 Health Education	3 (3,0)	or CAAH 304 Evol. of Visual Arts II	3 (3,0)
INED 302 Dwelling Materials and Construction Method	2 (1,2)	ED 335 Adoles. Growth and Dev.	3 (3,0)
Social Science Requirement[3]	3	INED 317 Mgt. of Ind. Ed. Labs	3 (2,2)
Elective	4	Social Science Requirement[3]	3
	15	Elective	2
			14

SUMMER

INED 450 Industrial Cooperative Experience 6 (0,18)

SENIOR YEAR

INED 405 Course Organization and Eval.	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
INED 422 Hist. and Phil. of Industrial and Voc. Ed.	3 (3,0)	INED 402 Directed Teaching	12 (0,36)
INED 425 Teaching Ind. Subj.	3 (3,0)		15
INED 441 Comp. Lab. in Ind. Ed.	3 (1,4)		
Area of Specialty	3		
	15		

135 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]To be selected from the following: astronomy, biology, chemistry, geology, or physics. At least two fields must be represented, one of which must be in the biological sciences.

[3]Anthropology, economics, geography, history, philosophy, political science, psychology, religion, sociology. At least two fields must be represented with six, but not more than six, hours in one field.

SCIENCE TEACHING

The program leading to a Bachelor of Science degree in Science Teaching is designed for students planning to teach biological sciences, chemistry, earth science, mathematical sciences, or physical sciences on the secondary school level. The required science electives are included to give some degree of competency in a field other than the major area. Students are urged to discuss the National Teacher's Examination with their adviser upon completion of the sophomore year.

TEACHING AREA: BIOLOGICAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 301 Stat. Theory and Meth. I	3 (3,0)
Elective	3	MUS 210 or 311 Music Apprec.	3 (3,0)
	15		16

SOPHOMORE YEAR

BIOL 110 Prin. of Biology I	5 (4,3)	BIOCH 210 Elem. Biochemistry	4 (3,3)
ED 302 Educational Psychology	3 (3,0)	BIOL 111 Prin. of Biology II	5 (4,3)
HIST 173 Western Civilization	3 (3,0)	ED 335 Adol. Growth and Dev.	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Chemistry Elective	4		15
	18		

JUNIOR YEAR

ED 301 Principles of American Ed.	3 (3,0)	BOT 202 Survey of Plant Kingdom	4 (3,3)
GEN 302 Genetics	4 (3,3)	ED 471 The Exceptional Child	3 (3,0)
MICRO 305 General Microbiology	4 (3,3)	PHYS 208 General Physics II	4 (3,2)
PHYS 207 General Physics I	4 (3,2)	ZOOL 202 Vertebrate Zoology	4 (3,3)
Social Science Elective[2]	3	Elective	4
	18		19

SENIOR YEAR

BOT 421 Plant Physiology	4 (3,3)	ED 412 Directed Teaching[3]	12 (1,33)
or ZOOL 223 Human Physiology	4 (3,3)	ED 424 Methods and Materials in	
CAAH 303 Evol. of Vis. Arts I	3 (3,0)	Secondary School Instruction	3 (3,0)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 498 Secondary Content Area	
ED 458 Health Education	3 (3,0)	Reading	3 (1,4)
Social Science Elective[2]	3		18
Elective	3		
	16		

135 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Anthropology, economics, geography, philosophy, political science, psychology, religion, sociology.
[3]Block schedule must be taken as shown.

TEACHING AREA: CHEMISTRY

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	Elective	1
Elective	1		16
	17		

SOPHOMORE YEAR

CH 223 Organic Chemistry	3 (3,0)	CH 224 Organic Chemistry	3 (3,0)
CH 227 Organic Chemistry Lab.	1 (0,3)	ED 335 Adol. Growth and Dev.	3 (3,0)
ED 302 Educational Psychology	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	Literature Requirement[1]	3
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	Social Science Electve[2]	3
Literature Requirement[1]	3	Elective	1
Elective	1		16
	18		

JUNIOR YEAR

CH 313 Quantitative Analysis	3 (3,0)	CH 331 Physical Chemistry	3 (3,0)
ED 301 Principles of American Ed.	3 (3,0)	CH 339 Physical Chem. Lab.	1 (0,3)
PHYS 207 General Physics I	4 (3,2)	ED 471 The Exceptional Child	3 (3,0)
Social Science Elective[2]	3	PHYS 208 General Physics II	4 (3,2)
Elective	4	Elective	6
	17		17

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching[3]	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in Secondary School Instruction	3 (3,0)
CH 332 Physical Chemistry	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
CH 340 Physical Chem. Lab.	1 (0,3)		18
CH 402 Inorganic Chemistry	3 (3,0)		
ED 458 Health Education	3 (3,0)		
MUS 210 or 311 Music Apprec.	3 (3,0)		
	16		

135 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Anthropology, economics, geography, philosophy, political science, psychology, religion, sociology.
[3]Block schedule must be taken as shown.

TEACHING AREA: EARTH SCIENCE

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
CH 101 General Chemistry	4 (3,3)	CH 102 General Chemistry	4 (3,3)
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 102 Intro. to Math. Anal.	3 (3,0)
MTHSC 101 Finite Probability[2]	3 (3,0)	Elective	1
Elective	1		15
	16		

SOPHOMORE YEAR

ED 302 Educational Psychology	3 (3,0)	ED 335 Adol. Growth and Dev.	3 (3,0)
GEOL 101 Physical Geology	4 (3,2)	GEOL 102 Historical Geology	4 (3,3)
HIST 172 Western Civilization	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
PHYS 207 General Physics I	4 (3,2)	PHYS 208 General Physics II	4 (3,2)
Literature Requirement[1]	3	Literature Requirement[1]	3
	17		17

JUNIOR YEAR

ASTR 301 General Astronomy	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
ED 301 Principles of American Ed.	3 (3,0)	GEOL 405 Geomorphology	4 (3,3)
GEOL 306 Mineralogy	3 (2,3)	PHYS 240 Physics of the Weather	3 (3,0)
MTHSC 203 Elem. Stat. Inference	3 (3,0)	Science Elective	3
Elective	6	Social Science Elective[3]	3
	18		16

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching[4]	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in Secondary School Instruction	3 (3,0)
ED 458 Health Education	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
MUS 210 or 311 Music Apprec.	3 (3,0)		18
Science Elective	3		
Elective	3		
	15		

132 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Prerequisite: Satisfactory score on the Mathematics Test, Level II or permission of instructor.
[3]Anthropology, economics, geography, philosophy, political science, psychology, religion, sociology.
[4]Block schedule must be taken as shown.

TEACHING AREA: MATHEMATICAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
CH 101 General Chemistry	4 (3,3)	CH 102 or 112 General Chemistry	4 (3,3)
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	Elective	1
	16		16

SOPHOMORE YEAR

ED 302 Educational Psychology	3 (3,0)	CPSC 110 Elem. Comp. Prog.	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	ED 335 Adol. Growth and Dev.	3 (3,0)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	HIST 173 Western Civilization	3 (3,0)
PHYS 207 General Physics I	4 (3,2)	PHYS 208 General Physics II	4 (3,2)
Literature Requirement[1]	3	Literature Requirement[1]	3
	17		16

JUNIOR YEAR

ED 301 Principles of American Ed.	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	MTHSC 311 Linear Algebra	3 (3,0)
MTHSC 308 College Geometry	3 (3,0)	MTHSC 408 Topics in Geometry	3 (3,0)
Mathematics Elective[2]	3	Social Science Elective[3]	3
Social Science Elective[3]	3	Elective	6
Elective	3		18
	18		

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching[4]	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in Secondary School Instruction	3 (3,0)
ED 458 Health Education	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
MTHSC 350 Intro. to Math. Models	3 (3,0)		18
MTHSC 412 Intro. to Modern Alg.	3 (3,0)		
MTHSC 453 Advanced Calculus I	3 (3,0)		
MUS 210 or 311 Music Apprec.	3 (3,0)		
	18		

137 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Suggested electives: CPSC 130, MTHSC 405, 409, 452, 454
[3]Anthropology, economics, geography, philosophy, political science, psychology, religion, sociology.
[4]Block schedule must be taken as shown.

TEACHING AREA: PHYSICAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
CH 101 General Chemistry	4 (3,3)	CH 102 or 112 General Chemistry	4 (3,3)
ED 100 Orientation	1 (1,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	MTHSC 106 Cal. of One Var. I	4 (4,0)
MTHSC 105 Algebra and Trigonometry	5 (5,0)	Elective	1
Elective	1		16
	18		

SOPHOMORE YEAR

ED 302 Educational Psychology	3 (3,0)	CH 201 General Chemistry	4 (3,3)
HIST 172 Western Civilization	3 (3,0)	ED 335 Adol. Growth and Dev.	3 (3,0)
PHYS 207 General Physics I	4 (3,2)	HIST 173 Western Civilization	3 (3,0)
Literature Requirement[1]	3	PHYS 208 General Physics II	4 (3,2)
Science Elective	3	Literature Requirement[1]	3
	16		17

JUNIOR YEAR

ASTR 101 Solar System Astronomy	3 (3,0)	ASTR 102 Stellar Astronomy	3 (3,0)
ED 301 Principles of American Ed.	3 (3,0)	ED 471 The Exceptional Child	3 (3,0)
GEOL 101 Physical Geology	4 (3,2)	GEOL 102 Historical Geology	4 (3,3)
Social Science Elective[2]	3	PHYS 460 Contemporary Physics for High School Teachers	3 (3,0)
Elective	3	Social Science Elective[2]	3
	16		16

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 Evol. of Vis. Arts I	3 (3,0)	ED 412 Directed Teaching[3]	12 (1,33)
or CAAH 304 Evol. of Vis. Arts II	3 (3,0)	ED 424 Methods and Materials in Secondary School Instruction	3 (3,0)
ED 458 Health Education	3 (3,0)	ED 498 Secondary Content Area Reading	3 (1,4)
MUS 210 or 311 Music Apprec.	3 (3,0)		18
Science Elective	3		
Elective	6		
	18		

135 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Anthropology, economics, geography, philosophy, political science, psychology, religion, sociology.
[3]Block schedule must be taken as shown in either semester of the senior year.

COLLEGE OF ENGINEERING

The College of Engineering offers eight professional curricular programs and programs in Engineering Analysis and Engineering Technology. Each of the engineering programs offered leads to a wide range of career opportunities and serves as preparation for further study at the graduate level.

Requirements for Graduation In addition to other institutional requirements, and effective with all students entering after May 15, 1981, the following will apply to all candidates for a baccalaureate degree in Engineering and Engineering Technology.

For graduation, candidates will be required to have a 2.0 or higher cumulative grade-point ratio in all engineering and engineering technology courses taken at Clemson University. All of these courses exclusively utilize the word "Engineering" in the course designator (i.e., AGE 221, ET 201, ME 499, etc.).

Policy on Humanities and Social Sciences for Engineering Curricula To ensure that young engineers are aware of their responsibilities to society and are able to consider societal factors in the decision-making process, courses in the humanities and social sciences must be an integral part of their education. While there are many humanistic-social science courses that may be of interest and value to the engineering student, the objectives of the profession require the concentration of some courses in one or two areas rather than a selection of totally unrelated, introductory courses in different areas.

To meet these professional objectives, a student must complete a minimum of eighteen semester credit hours selected from a list of approved undergraduate courses in the humanities and social sciences. These eighteen semester credit hours must include the following:

1. Subject Area (Select A or B)
   (a) Nine semester credit hours in a given subject area.
   (b) Six semester credit hours in each of two different subject areas.
2. Literature

   Three semester credit hours in literature chosen from ENGL 202, 203, 204, 205, 206, 207, 208, or 209 (may be used in 1 above).

   Additional courses as required in a departmental curriculum (e.g., an economics or second literature course) also may be used in requirement 1 above.

All courses taken to satisfy the humanistic-social science credit requirement of an engineering curriculum must be selected from the list of approved undergraduate courses in the humanities and social sciences, which is available from the departmental advisers.

Policy on Electives for the Engineering and Engineering Technology Curricula Class advisers must approve any course taken for elective credit in the Engineering and Engineering Technology curricula. Courses excluded for elective credit in the Engineering curricula are as follows: ENGL 100, MTHSC 100, 101, 102, 104, 105, 115, 116, 215, 216, PHYS 207,

208, 460. Some examples of courses excluded for elective credit in the Engineering Technology curriculum are as follows: ENGL 100, MTHSC 100, 101, 102, 115, 116, 215, 216, PHYS 200, 460.

Professional Curricula Eight, four-year professional-oriented curricula are offered by the College of Engineering; namely, Agricultural Engineering, Ceramic Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering. Each of these professional curricula, except Computer Engineering and Industrial Engineering is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, the recognized national accrediting agency for professional curricula in engineering. The curriculum in Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.

Although the College of Engineering does not offer specific options or majors in each of these professional curricula, the instruction includes many phases of each respective field. Thus, a civil engineering student is graduated in civil engineering rather than structural engineering, highway engineering, sanitary engineering, or other such options. However, a student who wishes to study within the areas encompassed by these options will find adequate courses within the Civil Engineering curriculum to prepare himself for work in any of these areas. In the same way the other engineering curricula include thorough education in various phases of the field of specialization without overemphasizing one phase to the neglect of others. The professional curricula lead to a Bachelor of Science degree in the specific professional area.

The courses required in all engineering curricula, except Engineering Technology, for the freshman year follow. (For Engineering Technology see page 124).

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	Humanistic—Social Elective[2]	3
ENGR 180 Engineering Concepts	3 (2,2)	or ENGR 180 Engr. Concepts	3 (2,2)
or Humanistic—Social Elective[2]	3	MTHSC 108 Cal. of One Var. II	4 (4,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	PHYS 122 Phys. with Cal. I	3 (3,0)
Elective	2	Basic Science[1]	3-4
	16	Elective	1
			17-18

Engineering Analysis Curriculum[3] This curriculum is a four-year engineering science-oriented course of study. Its objectives are two-fold. These are (1) to prepare a student for employment in areas of engineer-

[1]Agricultural Engineering students should consult adviser. Ceramic Engineering students may take either CH 102 or 112. Chemical Engineering students are required to take CH 112. Mechanical Engineering students are required to take CH 102. Computer Engineering, Electrical Engineering and Industrial Engineering students are required to take 4 credits of Basic Science.

[2]See Policy on Humanities and Social Sciences for Engineering Curricula, page 112.

[3]Additional information is available in the Office of the Dean of Engineering.

ing activity requiring a high level of analytical competency, and (2) to provide a flexible undergraduate preparation for the study of engineering at the graduate level.

The curriculum leads to the Bachelor of Science degree in Engineering Analysis. Requirements for this degree are stated in terms of subject matter area rather than in terms of specific courses. Degree requirements are as follows:

See page 113 for Freshman year.

	Hours Credit
Area of Concentration	12
Basic Science (including 8 hours of physics)	16
Engineering Science (distributed in at least six engineering science areas)	32
Humanistic—Social Studies	32
Mathematical Sciences (including 12 hours of post-calculus mathematical sciences)	24
Electives	22
Total Semester Hours	138

The educational objectives of the program will be met by the selection of an area of concentration which will be chosen from several specialty areas offered within the professional engineering curricula. The selection of specific courses, particularly in the junior and senior years, will then depend primarily on the choice of the area of concentration. By judicious selection of courses within this flexible structure, a student may prepare himself for entry into the professional schools of law and medicine.

Maximum flexibility within this program is achieved by permitting a student to defer his choice of specialization until the junior year or later. Such deferral will then allow students from junior and senior colleges not offering engineering to transfer into the program with little or no loss in academic credit.

AGRICULTURAL ENGINEERING

The graduate in Agricultural Engineering with broad training in mathematics, physics, chemistry, and the biological sciences as well as comprehensive coverage of the engineering sciences is well equipped to apply engineering to many functons affecting the well-being of mankind. The agricultural engineer is sought by industry and public service organizations primarily for his ability to apply engineering know-how to agricultural production and processing and to the management of land and water resources. Specific areas of interest include power and machinery, soil and water resources engineering, electric power and processing, structures and environment, and food engineering.

The curriculum includes such engineering sciences as mechanics, fluids, thermodynamics, electrical theory, computing devices, and systems analyses. The basic agricultural sciences of soil, plants, and animals are included to provide a foundation for agricultural engineering analysis and design. Also included are the important facets of energy conversion, engineering properties of biological materials, research methods, and use of economy and integrity in design.

Graduate programs lead to the Master of Science, Master of Engineering, and the Doctor of Philosophy degrees.

Opportunties for employment of agricultural engineering graduates include design engineers, research engineers, production engineers, or as sales engineers with industry; as teachers, research, extension, or field engineers with state and federal agencies; engineers in the private sectors; and others.

See page 113 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
AGE 221 Soil and Water Resources Engineering I	3 (2,3)	AGE 212 Fund. of Mechanization	3 (2,3)
EG 109 Engr. Graphics	2 (1,3)	EM 202 Engr. Mech. (Dynamics)	3 (3,0)
EM 201 Engr. Mech. (Statics)	3 (3,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	PHYS 222 Phys. with Cal. III	3 (3,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	Plant Science Elective[2]	3
Literature Requirement[1]	3	Elective	1
Elective	1		17
	19		

JUNIOR YEAR

AGE 353 Computational Systems	2 (1,3)	AGE 362 Energy Conv. in Ag. Sys.	3 (2,3)
AGE 355 Engr. Anal. and Creat.	2 (1,3)	AGE 364 Agric. Waste-Management Systems	2 (2,0)
E&CE 307 Basic Elec. Engr.	2 (2,0)	AGE 433 Design Criteria for Plant and Animal Environment	2 (2,0)
E&CE 309 Elec. Engr. Lab. I	1 (0,2)	AGE 465 Engr. Prop. of Biol. Mat.	2 (1,3)
EM 304 Mechanics of Materials	3 (3,0)	AGRON 202 Soils	3 (2,2)
ME 311 Engr. Thermo. I	3 (3,0)	EM 320 Fluid Mechanics	3 (3,0)
Animal Science Elective[2]	3	Humanistic—Social Elective[2]	3
	16		18

SENIOR YEAR

AGE 431 Agric. Structures Design	3 (2,3)	AGE 416 Agric. Machinery Design	3 (2,3)
AGE 471 Research I	1 (0,3)	AGE 422 Soil and Water Resources Engineering II	3 (2,3)
ECON 211 Prin. of Economics	3 (3,0)	AGE 442 Agric. Process Engr.	3 (2,3)
or ECON 200 Econ. Concepts	3 (3,0)	AGE 472 Research II	1 (0,3)
Humanistic—Social Elective[2]	3	Engineering Science Elective[2]	3
Mathematical Sciences Elective[2]	3	Humanistic—Social Elective[2,3]	3
Elective	3	Elective	2
	16		18

138 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Electives to be selected in consultation with adviser. (See Policy on Humanities and Social Sciences for Engineering Curricula page 112.)
[3]Not required of students who complete the ROTC program.
Note: Agricultural Engineering curriculum is jointly administered by the College of Engineering and the College of Agricultural Sciences.

CERAMIC ENGINEERING

Window glass, implantable teeth, brick, ceramic bones, nuclear fuel, radomes, solid-state electronic devices, and bathroom fixtures are illus-

trations of the variety of products of the multibillion-dollar ceramic industry. Ceramic engineers are engineers to this industry, providing professional service in research, design, technical sale, production, and management.

The curriculum is an engineering curriculum with 75 percent of the course time devoted to coursework common to all engineers and 25 percent to specialization in the field of ceramics. The core courses are in mathematics, basic science, engineering science, humanities, and social sciences. The specialized courses are in nonmetallic minerals, high-temperature chemistry, thermal processing, and material characterization.

The curriculum leads to the degree of Bachelor of Science in Ceramic Engineering. Graduate courses are offered leading to advanced degrees.

See page 113 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
CRE 201 Intro. to Ceramic Engr.	2 (2,0)	CRE 202 Ceramic Materials	3 (3,0)
CRE 204 Laboratory Procedures	1 (0,3)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	PHYS 222 Phys. with Cal. III	3 (3,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	Literature Requirement[1]	3
Literature Requirement[1]	3	Planned Elective	4
Planned Elective	3	Elective	1
Elective	1		18
	17		

JUNIOR YEAR

CH 331 Physical Chemistry	3 (3,0)	CRE 302 Thermo-Chemical Cer.	3 (3,0)
CRE 304 Experiment Design	2 (1,3)	CRE 309 Research Methods	2 (0,6)
CRE 307 Thermal Process of Cer.	3 (3,0)	E&CE 308 Electronics and Electromechanics	2 (2,0)
E&CE 307 Basic Elec. Engr.	2 (2,0)	E&CE 310 Elec. Engr. Lab. II	1 (0,2)
E&CE 309 Elec. Engr. Lab. I	1 (0,2)	Planned Elective	6
EM 201 Engr. Mech. (Statics)	3 (3,0)	Elective	3
Planned Elective	3		17
	17		

SENIOR YEAR

CRE 402 Solid State Ceramics	3 (3,0)	CRE 403 Glasses	3 (3,0)
EM 304 Mechanics of Materials	3 (3,0)	ME 304 Heat Transfer	3 (3,0)
Planned Elective	9	Planned Elective	12
Elective	2		18
	17		

138 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209

Note: Nine credits of planned electives must be taken in humanistic—social science courses. Nineteen credits of planned electives should be technical courses selected with the help of class adviser.

CHEMICAL ENGINEERING

The Chemical Engineering curriculum is unique in that it is based on the three sciences of chemistry, physics, and mathematics. As a result, the traditional chemical-process industries which produce the industrial chemicals upon which our modern society is based require large numbers of chemical engineers. In addition, graduates are avidly sought by industries in many areas of specialized technology such as nuclear

power, fibers and textiles, pharmaceuticals, pulp and paper, computers, foods, metals, ceramics, instrumentation and automatic control, and petroleum. The chemical engineer is in the forefront of the fight against environmental pollution and is leading the way in applying engineering technology to the solution of medical and health-related problems.

The chemical engineering graduate, because of his broad background in three sciences, is uniquely prepared for a wide variety of careers in which he can apply his abilities and education. By the judicious use of electives and course selection, and with the advice and consent of his adviser, a chemical engineering student may enhance his basic education by the selection of an option designed to further a specific career objective. Such options might be used to prepare him to enter other professional schools, such as medicine, dentistry, or law.

See page 113 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
CH 223 Organic Chemistry	3 (3,0)	CH 224 Organic Chemistry	3 (3,0)
CHE 201 Intro. to Chem. Engr.	3 (2,2)	CH 229 Organic Chemistry Lab.	1 (0,3)
EG 109 Engr. Graphics	2 (1,3)	CHE 210 Process Modeling and Numerical Methods	3 (3,0)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	EM 201 Engr. Mech. (Statics)	3 (3,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Elective	1	Elective	1
	19		18

JUNIOR YEAR

CH 331 Physical Chemistry	3 (3,0)	CH 332 Physical Chemistry	3 (3,0)
CH 339 Physical Chemistry Lab.	1 (0,3)	CH 340 Physical Chemistry Lab.	1 (0,3)
CHE 301 Unit Op. Theory I	3 (3,0)	CHE 302 Unit Op. Theory II	3 (3,0)
E&CE 307 Basic Elec. Engr.	2 (2,0)	CHE 306 Unit Op. Lab. I	2 (1,3)
E&CE 309 Elec. Engr. Lab. I	1 (0,2)	CHE 331 Chem. Engr. Thermo. I	3 (3,0)
EM 304 Mech. of Materials	3 (3,0)	CHE 353 Process Dynamics	3 (3,0)
MTHSC 425 Orthogonal Functions and Boundary Value Problems	3 (3,0)	Humanistic—Social Elective[2]	3
Elective	3		18
	19		

SENIOR YEAR

CHE 403 Unit Op. Theory III	3 (3,0)	CHE 401 Trans. Phenomena	3 (3,0)
CHE 407 Unit Op. Lab. II	3 (1,6)	CHE 422 Process Dev. Design and Optimiza. of Chem. Engr. Sys. II	3 (0,9)
CHE 421 Process Dev. Design and Optimiza. of Chem. Engr. Sys. I	3 (2,3)	CRE 419 Sci. of Engr. Materials	3 (3,0)
CHE 430 Chem. Engr. Thermo II	3 (3,0)	PHYS 222 Phys. with Cal. III	3 (3,0)
CHE 440 Senior Inspection Trip	0	Humanistic—Social Elective[2]	3
CHE 450 Chem. Engr. Kinetics	3 (3,0)	Elective	3
Humanistic—Social Elective[2]	3		18
	18		

144 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]See Policy on Humanities and Social Sciences for Engineering Curricula, page 112.)

CIVIL ENGINEERING

Civil engineering involves the planning, design, construction, maintenance, and use of facilities and systems to control and improve the environment for modern civilization. Civil engineering is the broadest of the engineering professions, being the stem from which most other branches of engineering have developed.

The program in Civil Engineering leads to the Bachelor of Science degree and is designed to equip the graduate with a knowledge of basic science, engineering science, and engineering design. The civil engineering graduate is prepared to work immediately upon graduation in practically any of the areas of the profession. These include traffic and transportation engineering, structural engineering, construction, soils and foundation engineering, ocean and coastal engineering, airphoto interpretation, hydrology, public works engineering, and others. The engineering student is also educated in the humanities, social sciences, and in economic issues. A concerned society demands economy as well as realistic consideration of the resulting human benefits of the engineer's endeavors.

Graduates are encouraged to become registered engineers and to continue their education throughout their professional careers. Many students find that programs in Civil Engineering provide excellent preparation for careers in technical sales and management.

See page 113 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
CE 201 Surveying	3 (2,3)	EG 109 Engineering Graphics	2 (1,3)
EM 201 Engineering Mechanics: Statics	3 (3,0)	EM 304 Mechanics of Materials	3 (3,0)
MTHSC 206 Calculus of Sev. Variables	4 (4,0)	EM 305 Mechanics of Materials Lab.	1 (0,3)
PHYS 221 Physics with Calculus II	3 (3,0)	MTHSC 208 Intro. to Ord. Diff. Eq.	4 (4,0)
Literature Requirement[1]	3	PHYS 222 Physics with Calculus III	3 (3,0)
Elective	1	Literature Requirement[1]	3
	17	Elective	1
			17

JUNIOR YEAR

CE 205 Civil Engr. Comp. Ap.	3 (2,2)	CE 302 Structural Steel Design	3 (2,2)
CE 301 Structural Analysis I	3 (2,2)	CE 310 Transportation Engineering	4 (3,2)
CE 320 Intro. to Cons. Materials	3 (2,3)	CE 324 Intro. to Construction Engineering	3 (3,0)
CRE 310 Intro. to Material Science	3 (3,0)	EM 320 Fluid Mechanics	3 (3,0)
EM 202 Engineering Mechanics: Dynamics	3 (3,0)	EM 322 Fluid Mechanics Lab.	1 (0,3)
ENGL 314 Technical Writing	3 (3,0)	ESE 401 Environmental Engineering	3 (3,0)
	18		17

SENIOR YEAR

CE 330 Soil Mechanics	3 (2,2)	CE 402 Reinforced Concrete Design	3 (2,2)
CE 421 Hydrology	3 (3,0)	CE 425 Engineering Relations	3 (3,0)
ECON 200 Economic Concepts	3 (3,0)	ME 311 Engineering	
or ECON 211 Principles of Econ.	3 (3,0)	Thermodynamics I	3 (3,0)
E&CE Elective	3	Humanistic—Social Elective[3]	3
Humanistic—Social Elective[3]	3	Technical Elective[2,3]	3
Technical Elective[2,3]	3	Technical Elective[3]	3
	18		18

138 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Six credits of Technical electives may be advanced ROTC courses.
[3]Each class adviser has a list of approved electives from which students may make selections.
(See Policy on Humanities and Social Sciences for Engineering Curricula, page 112.)
Note: The first and second semesters of the senior year are interchangeable.

COMPUTER ENGINEERING

The program in Computer Engineering leads to a Bachelor of Science degree which provides an indepth education into a wide range of computer topics including computer hardware, software and applications. Emphasis is placed on giving students hands-on experience with computers of all sizes (micro, mini, and large) by solving a wide range of real-world problems using engineering principles.

The career opportunities for computer engineers are excellent. The rapid advances in microelectronics and for growth of microcomputer applications, as well as continued expansion of large computer systems, indicate this strong demand will continue.

The curriculum is based on three main concepts: (1) It is an engineering curriculum which provides a solid foundation in mathematics, basic sciences, and the humanistics while emphasizing the engineering approach to problem solving. (2) The required computer courses provide an excellent knowledge of hardware, software, and systems. (3) A large number of elective hours are provided which allows students to specialize in one or more computer areas or to choose a minor in a non-computer area. The Computer Engineering program prepares a student for entering the engineering profession in a rapidly advancing area, and it provides a good background for study in other professions.

See page 113 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
E&CE 201 Logic and Comp. Devices	3 (1,4)	E&CE 202 Electric Circuits I	3 (3,0)
E&CE 250 Principles of Digital		E&CE 203 Electric Circuits Lab. I	1 (0,2)
Computer Systems	3 (2,2)	E&CE 350 Mini-Micro Comp. Prog.	3 (2,2)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	ECON 200 Economic Concepts	3 (3,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	or ECON 211 or 212 Prin. of Econ.	3 (3,0)
Literature Requirement[1]	3	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
Elective	2	Engineering Science Elective[2]	3 (3,0)
	18		17

JUNIOR YEAR

E&CE 301 Electric Circuits II	2 (2,0)	E&CE 322 Electronics for Comp. Engineers	3 (3,0)
E&CE 303 Electric Circuits Lab. II	1 (0,2)	E&CE 352 Mach., Lang., and Algorithms	3 (3,0)
E&CE 351 Real Time Application of Digital Comp.	3 (2,2)	E&CE 425 Microcomputers I	3 (2,2)
E&CE 429 Comp. Organization	3 (3,0)	E&CE 452 Programming Systems	3 (3,0)
Engineering Science Elective[2]	3	Elective[3]	5
Humanistic—Social Elective[4]	3		17
Elective	2		
	17		

SENIOR YEAR

E&CE 417 Software Design	3 (3,0)	E&CE 450 Comp. Sys. Design Project	2 (0,4)
E&CE 460 Computer-Aided Analysis and Design	3 (3,0)	Humanistic—Social Elective[4]	3
Humanistic—Social Elective[4]	3	Elective[3]	12
Elective[3]	9		17
	18		

138 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]Each student's program must include six credits in engineering science including three credits outside the department. Choose from CHE 415, CRE 310, 416, E&CE 302, 317, 330, 340, 341, 428, 436, EM 201, 202, 211, 304, 305, 320, ME 304, 311, 312, 403.

[3]Twenty-four of the thirty-three electives are to be completed under one of two alternatives.

(a) Without minor: twelve hours from approved computer courses including a minimum of six credits design oriented; twelve hours from approved general technical courses.

(b) With minor: twelve hours from approved computer courses including a minimum of six credits design oriented; twelve hours in minor field.

[4]See Policy on Humanities and Social Sciences for Engineering Curricula, page 112.

ELECTRICAL ENGINEERING

Responsibilities of the electrical engineering profession range from highly analytical problem solving to detailed design. The Electrical Engineering program is intended to emphasize both the close relationship of computers to all phases of the profession and the major role that computers play in the curriculum at Clemson.

Systems, electronic networks, and electromagnetic fields provide the core curriculum areas. These fundamental studies in analysis and experimentation receive further development in elective courses. Humanistic—social electives provide the graduate with the ability to address himself to the "why" of engineering as well as the "how."

Students who are interested in communications study information theory, electromagnetic theory, switching circuits, and electronics.

Technological innovations in electronics have resulted in increasingly complex solid-state components—the transistor, integrated circuit, and LSI component. The electronics emphasis includes solid-state devices and circuits and integrated circuit technology.

The department offers courses in real-time computing, computer language structures, theory and design of digital computers, computation and simulation of physical systems, and information processing and data handling.

Energy systems analysis and energy conversion are appropriate for students who plan to work for electric utilities, electrical equipment manufacturers, or companies which are large users of electrical energy.

See page 113 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
E&CE 201 Logic and Comp. Dev.	3 (1,4)	E&CE 202 Electric Circuits I	3 (3,0)
ECON 200 Economic Concepts	3 (3,0)	E&CE 203 Electric Circuits Lab. I	1 (0,2)
or ECON 211 or 212 Prin. of Econ.	3 (3,0)	E&CE 250 Principles of Digital Computer Systems	3 (2,2)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	PHYS 222 Phys. with Cal. III	3 (3,0)
Literature Requirement[1]	3	PHYS 224 Physics Lab. II	1 (0,3)
Elective	3	Elective	3
	19		18

JUNIOR YEAR

E&CE 301 Electric Circuits II	2 (2,0)	E&CE 302 Linear Control Sys.	3 (3,0)
E&CE 303 Elec. Circuits Lab. II	1 (0,2)	E&CE 317 Electrical Sys. Analysis	3 (3,0)
E&CE 320 Electronics I	2 (2,0)	E&CE 321 Electronics II	2 (2,0)
E&CE 325 Electronics Lab. I	1 (0,2)	E&CE 326 Electronics Lab. II	1 (0,2)
E&CE 330 Electrical Sys. Analysis	3 (3,0)	E&CE 341 Electric and Magnetic Fields II	2 (2,0)
E&CE 340 Electric and Magnetic Fields I	2 (2,0)	E&CE 420 Power Sys. Analysis I	3 (3,0)
EM 202 Engr. Mech.: Dynamics	3 (3,0)	or E&CE 421 Electrical Machinery	3 (3,0)
or EM 211 Particle Mechanics: Statics and Dynamics	3 (3,0)	Technical Elective[3]	3
Humanistic—Social Elective[2]	3		17
	17		

SENIOR YEAR

E&CE 410 Intro. to Dig. Cont. Sys.	3 (3,0)	E&CE 402 Engineering Project[4]	1 (0,2)
E&CE 422 Electronics III	3 (3,0)	E&CE 411 Electrical Systems	1 (0,2)
Humanistic—Social Elective[2]	3	E&CE 451 System Design Project	2 (0,4)
Technical Elective[3]	8	Humanistic—Social Elective[2]	3
	17	Technical Elective[3]	9
			16

138 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]These courses must be selected from the departmental list of approved humanistic—social electives. The courses must be selected so as to satisfy the college sequence requirements. (See Policy on Humanities and Social Science for Engineering Curricula, page 112).

[3]A minimum of six credits of technical electives must be selected from design courses in the Electrical and Computer Engineering Department. Six credits must be selected from the engineering sciences.

[4]Not required of students who complete the ROTC program.

INDUSTRIAL ENGINEERING

Industrial engineers design, install, and improve the complex systems which provide both goods and services vital to our society and economy. These systems integrate people, materials, and equipment and thereby place unique demands for breadth of preparation upon industrial engineers. Knowledge is required in mathematical, physical, and social sciences; economic, operational, and engineering analyses; and the principles and techniques of engineering design. Because of the closeness of industrial engineering problems to management, a special need exists for industrial engineers to be able to work and communicate with managers.

The traditional arenas for the practice of industrial engineering are the manufacturing facilities of industry. However, today fully one-third of practicing industrial engineers are employed in nonmanufacturing institutions such as hospitals and banks and in government service.

In addition to numerous employment opportunities in South Carolina and other states, an industrial engineering graduate may pursue further formal education. The Department of Industrial Engineering offers Systems Engineering programs leading to the Master of Science and Doctor of Philosophy degrees.

See page 113 for Freshman year.

SOPHOMORE YEAR

E&CE 299 Digital Computation	2 (1,2)	EM 211 Part. Mech.: Stat. and Dyn.	3 (3,0)
IE 265 Meth. of Industrial Engr. I	3 (2,3)	IE 266 Meth. of Industrial Engr. II	3 (2,3)
MTHSC 206 Cal. of Several Var.	4 (4,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
PHYS 221 Physics of Cal. II	3 (3,0)	Basic Science Elective[2]	3
Basic Statistics Elective[2]	3	Engineering Graphics Elective[2]	2-3
Literature Requirement[1]	3	Literature Requirement[1]	3
	18		18-19

JUNIOR YEAR

ACCT 200 Basic Accounting[3]	3 (3,0)	ENGL 314 Technical Writing	3 (3,0)
E&CE 307 Basic Electrical Engr.	2 (2,0)	IE 361 Ind. Application of Stat.	3 (3,0)
E&CE 309 Electrical Engr. Lab.	1 (0,2)	IE 481 Meth. of Operation Res. II	3 (3,0)
ECON 200 Economic Concepts[4]	3 (3,0)	ME 311 Engineering Thermo. I	3 (3,0)
IE 365 Meth. of Industrial Engr. III	3 (2,3)	Computer or Infor. Sys. Elective[2]	3
IE 480 Meth. of Operation Res. I	3 (3,0)	Materials/Processes Elective[2]	3
Materials/Processes Elective	3		18
	18		

SENIOR YEAR

HIST 309 History of Technology	3 (3,0)	IE 483 Case Studies in Ind. Engr.	3 (3,0)
IE 482 Systems Modeling	3 (3,0)	IE 486 Prod. Plan. and Control	3 (3,0)
IE 484 Engr. Econ. Analysis	3 (3,0)	IE 496 Senior Research II	1 (0,3)
IE 495 Senior Research I	1 (0,3)	Computer or Infor. Sys. Elective[2]	3
Applied Statistics Elective[2]	3	Humanistic—Social Elective[2]	3
Human Resources Elective[2]	3	Elective	4
Elective	3		17
	19		

141 Total Semester Hours

[1]To be selected from ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]To be selected from an approved list. (See adviser.)
[3]ACCT 201 accepted.
[4]ECON 211 or 212 accepted.

MECHANICAL ENGINEERING

Mechanical engineers are involved in the solution to mankind's basic problems: the maintenance and development of food, shelter, clothing, health, transportation, and communications. These problems require that the mechanical engineer be prepared to work in a wide variety of areas including bioengineering, energy systems, environmental and life-support systems, propulsion and transportation systems, food technology, materials processing and manufacturing, construction techniques, and maintenance. Their functions may range from technical management to basic research and development, but they all involve innovative problem-solving skills.

In preparing an individual for a 40-45 year professional career, it is essential to develop the entire person. This involves a balanced program

encompassing the humanities, social sciences, communicative skills, basic sciences, engineering sciences, and laboratory and design experience. The student begins with the basic sciences and communicative skills, progresses through the engineering sciences, and finally applies these principles in such areas as engergy conversion and transfer, mechanical design and system analysis. It is in this final stage that the student experiences the relevant problem-solving aspects of engineering.

Most mechanical engineering graduates take positions in industry, government, or business, but many others continue their formal education in a graduate program. The Department of Mechanical Engineering offers study leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees.

See page 113 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
CRE 310 Intro. to Material Sci.	3 (3,0)	EM 202 Engineering Mechanics: Dynamics	3 (3,0)
EG 109 Engineering Graphics	2 (1,3)	ME 202 Engr. Mat. and Manuf. Proc.	2 (2,0)
EM 201 Engr. Mechanics: Statistics	3 (3,0)	MTHSC 208 Intro. to Ord. Diff. Equ.	4 (4,0)
ME 201 Foundations of Engr. Design	2 (2,0)	PHYS 222 Physics with Calculus III	3 (3,0)
MTHSC 206 Calculus of Several Var.	4 (4,0)	Literature Requirement[1]	3
PHYS 221 Physics with Calculus II	3 (3,0)	Humanistic—Social Elective[2]	3
	17		18

JUNIOR YEAR

E&CE 307 Basic Elec. Engineering	2 (2,0)	E&CE 308 Elec. and Electromechanics	2 (2,0)
E&CE 309 Electrical Engr. Lab I	1 (0,2)	E&CE 310 Electrical Engr. Lab. II	1 (0,2)
EM 304 Mechanics of Materials	3 (3,0)	ME 302 Dynamic Systems and Control	3 (3,0)
EM 305 Mechanics of Materials Lab	3 (3,0)	ME 304 Heat Transfer	3 (3,0)
EM 320 Fluid Mechanics	1 (0,3)	ME 312 Engr. Thermodynamics II	3 (3,0)
ME 301 Engineering Systems Analysis	3 (3,0)	ME 313 Instrumentation and Measurements	3 (2,3)
ME 311 Engineering Thermodynamics I	3 (3,0)	Humanistic—Social Elective[2]	3
	16		18

SENIOR YEAR

ME 401 Design of Mechanical System Components	3 (3,0)	ME 402 Intern. in Engr. Design	2 (1,3)
ME 405 Kinematics and Dynamics of Machinery	3 (3,0)	ME 414 Mech. Sys. Lab. or ME 413 Thermal Sys. Lab.	1 (0,3)
ME 412 Intro. to Comp. Flow and Turbomachinery	3 (3,0)	Humanistic—Social Elective[2]	6
ME 413 Thermal Systems Lab. or ME 414 Mech. Sys. Lab.	1 (0,3)	Technical Elective[3]	6
Technical Elective[3]	3	Elective	3
Elective[4]	4		18
	17		

138 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]To be selected from the departmental list of approved Humanistic-Social electives. (See Policy on Humanities and Social Sciences for Engineering Curricula, page 112.)

[3]To be selected from the departmental list of approved Technical electives with the assistance of a faculty adviser.

[4]To be selected from the departmental list of electives with approval of adviser, which list includes aerospace studies and military science.

ENGINEERING TECHNOLOGY

This curriculum is a four-year, applications-and-job oriented plan of study which leads to a Bachelor of Science degree in Engineering Technology. The Engineering Technology program is accredited by the Technology Accreditation Commission of Accreditation Board of Engineering and Technology. It provides a broad base of fundamentals and their application in the areas of civil, electrical, mechanical, and industrial engineering technology. In addition, electives amounting to approximately two semesters of work permit developing a program to match the student's aptitudes and interests as related to industrial and other employment opportunities. These opportunities are found in such areas as plant engineering, electrical and mechanical equipment development, production supervision, industrial planning, production methods, technical purchasing and sales, building construction, quality control, technical personnel management, specification, operation and supervision of plant environmental and energy systems, equipment maintenance, and technical writing and drawing.

The engineering technologist is typically a practical person interested in applying engineering principles and in organizing people for industrial production, construction or operation; or in the improvement of devices, processes, methods or procedures, as contrasted to the engineer whose more indepth, theoretical training qualifies him more for doing original system design.

The Engineering Technology program is designed to educate both regular four-year students and transfer students from community colleges and technical education colleges.

FRESHMAN YEAR

First Semester		Second Semester	
EG 109 Engineering Graphics[4]	2 (1,3)	CPSC 110 Elem. Computer Prog.	3 (3,0)
ENGL 101 Composition I	3 (3,0)	EG 110 Engr. Design Graphics[4]	2 (1,3)
MTHSC 104 Trigonometry[2]	2 (2,0)	ENGL 102 Composition II	3 (3,0)
Basic Science Elective[3]	4	MTHSC 106 Cal. of One Var. I	4 (4,0)
Humanistic—Social Elective[7]	3	Humanistic—Social Elective[7]	3
Elective	3	Elective	3
	17		18

SOPHOMORE YEAR

ET 207 Intro. to Ind. Engr. Tech.[4]	3 (3,0)	ET 211 Electrical Circuits I[4]	3 (2,3)
MTHSC 108 Cal. of One Var. II	4 (4,0)	ET 241 Statics and Strength of Materials[4]	3 (3,0)
PHYS 207 General Physics	4 (3,2)	ET 295 Problems in Technology[4]	3 (3,0)
Literature Requirement[1]	3	PHYS 208 General Physics	4 (3,2)
Elective	3	Literature Requirement[1]	3
	17		16

JUNIOR YEAR

ET 201 Manufacturing Processes[4]	3 (2,3)	ENGL 314 Technical Writing	3 (3,0)
ET 221 Elements of Electronics[4]	3 (2,3)	ET 365 Ind. Process Meas. and Cont.[4]	3 (2,3)
ET 351 Applied Thermodynamics I[4]	3 (3,0)	ET 375 Materials of Industry[4]	3 (3,0)
Humanistic—Social Elective[7]	3	Technical Specialty[5]	7
Technical Specialty[5]	3		
	15		16

SENIOR YEAR

ET 491 Tech. Proj. Iden. and Spec.[6]	1 (0,3)	ET 492 Technical Design Project[6]	1 (0,3)
IE 484 Engineering Economic Analysis[4]	3 (3,0)	Technical Specialty[5]	8
Technical Specialty[5]	6	Elective	6
Elective	6		15
	16		

130 Total Semester Hours

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[1]To be selected from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]A student with a SAT Mathematics Achievement Test, Level II score of less than 500 will be required to take MTHSC 105 in place of MTHSC 104, the three extra credits not counting toward graduation. A student with a test score of 550 or greater may take MTHSC 106 directly, another mathematics or science course being selected to replace MTHSC 104.

[3]CH 101 is required except by consent of department head.

[4]Technical core courses.

[5]Course to be selected from an Engineering Technology Specialty area. A list of courses constituting these specialty areas is available from a class adviser. Dual specialties are possible by coordinating with the department head.

[6]ET 493 may be taken in lieu of ET 491 and 492.

[7]See Policy on Humanities and Social Sciences for Engineering Curricula, page 112.)

COLLEGE OF FOREST AND RECREATION RESOURCES

The College of Forest and Recreation Resources is concerned with the management, use, and stewardship of all our forest resources and with individual and societal well-being through wise use of leisure. These two general areas of study offer broad opportunities in the management of our forest and recreation resources for their maximum service to present and future generations.

The College of Forest and Recreation Resources offers curricula designed to prepare students for professional careers in the following areas:

1. The Forest Management curriculum prepares graduates for employment as managers and administrators of forest lands for production of timber, water, wildlife, esthetic values, and recreation use.
2. The Wood Utilization curriculum prepares graduates for careers in the forest products and allied industries in the areas of production, utilization, and marketing of wood and allied products.
3. The Parks, Recreation, and Tourism Management curriculum prepares graduates for careers as managers of leisure-service programs such as those for counties, municipalities, institutions, voluntary and youth-serving agencies, and for various opportunities within the travel and tourism industry as well as resource management systems at local, state, and federal levels.

FOREST MANAGEMENT

The Forest Management curriculum combines a broad education in liberal arts and the physical, mathematical, and biological sciences with the applied forest sciences needed in the management of the forest and forest environment for their products and services. Foresters of professional standing are employed in various capacities by private concerns and by federal, state, and other public agencies.

Because of the nature of their education, foresters are qualified for a broad spectrum of employment possibilities. They may be engaged as managers, administrators, or owners of forest lands or forest-based businesses; as technical specialists in the production of timber, useable water, wildlife, and esthetic values, and in the recreational use of the forest; or as professionals in other areas where the conservation of our natural resources is a matter of concern. Foresters earning advanced degrees find employment in academic work and in research conducted both by public and private agencies.

The undergraduate curriculum provides a strong program in the basic knowledge and skills required of a professional forester. The curriculum is also designed to provide the necessary prerequisites for those students that desire to continue in graduate study. The Department of Forestry offers graduate programs that lead to a Master of Science, Master of Forestry, and Doctor of Philosophy degrees.

The Forest Management curriculum is accredited by the Society of American Foresters.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BOT 205 Plant Form and Function	4 (3,3)
CH 101 General Chemistry	4 (3,3)	CH 102 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	CPSC 110 Elem. Comp. Prog.	3 (3,0)
FOR 101 Introduction to Forestry	1 (1,0)	EG 105 Engineering Drawing	2 (1,3)
MTHSC 106 Cal. of One Var. I	4 (4,0)	ENGL 102 Composition II	3 (3,0)
POSC 101 American National Govt.	3 (3,0)	FOR 102 Introduction to Forestry	1 (1,0)
	18		17

SOPHOMORE YEAR

AGRON 202 Soils	3 (2,2)	CE 201 Surveying	3 (2,3)
ECON 212 Principles of Economics	3 (3,0)	ENGL 301 Public Speaking	3 (3,0)
FOR 205 Dendrology	4 (3,3)	FOR 206 Silvics	4 (3,3)
PHYS 207 General Physics I	4 (3,2)	Business Requirement[2]	3
Literature Requirement[1]	3	Social Science Elective	3
	17	Elective	2
			18

FORESTRY SUMMER CAMP

FOR 251 Forest Plants	1
FOR 252 Forest Engineering	2
FOR 253 Forest Mensuration	4
FOR 254 Forest Products	1
FOR 256 Forest Operations	1
	9

JUNIOR YEAR

ENGL 314 Technical Writing	3 (3,0)	BOT 421 Plant Physiology	4 (3,3)
EXST 301 Introductory Statistics	3 (2,2)	FOR 302 Forest Mensuration	3 (2,3)
FOR 301 Forest Entomology	3 (2,3)	FOR 304 Forest Economics	3 (3,0)
FOR 308 Aerial Photos in For.	3 (2,3)	FOR 306 Wood and Wood Fiber	
FOR 415 For. Wildlife Mgt.	3 (2,3)	Identification	2 (1,3)
Emphasis Area	3	FOR 310 Silviculture	4 (3,3)
	18		16

SENIOR YEAR

FOR 401 Harvesting For. Prod. I	2 (1,3)	FOR 412 Forest Protection	2 (2,0)
FOR 407 Forest Pathology	3 (2,3)	FOR 414 Forest Management Plans	3 (1,6)
FOR 417 Forest Mgt. and Reg.	4 (3,3)	FOR 416 Forest Policy and Admin.	2 (2,0)
FOR 420 Forest Products	3 (2,3)	FOR 418 Forest Valuation	3 (3,0)
Emphasis Area	6	Elective[2,3]	8
	18		18

149 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]To be selected from the following: ACCT 201, MGT 301, PSYCH 201, SOC 201.
[3]Any 300- or 400-level course or as specifically approved by the class adviser.

Notes: The emphasis areas are Forest Management, Forest Economics and Marketing, Forest Biology, Forest Wildlife Management, Forest Recreation, Forest Harvesting, Forest Influences, Forest Protection, Forest Biometrics, Forest Soils, Industrial Forestry, Forestry in the Social Context, and Wood Utilization. The student selects one of these and in consultation with an academic adviser schedules approved courses for that particular emphasis area.

No credit will be allowed in the Forest Management curriculum for ENGL 100 to satisfy requirements for graduation.

WOOD UTILIZATION

The Wood Utilization curriculum combines a broad education in the sciences and humanities. Emphasis in the professional courses is placed

on the role of wood as a basic forest resource. Graduates are employed by wood-using industries and their suppliers, research laboratories, trade associations, and state and federal organizations.

The core curriculum allows for emphases in three areas of specialization: Wood Science, Wood Industries Management, and Forest Management. Wood Science deals with the properties and processing of wood, wood fiber, and products derived from wood. Wood Industries Management prepares students for the managerial aspects of forest products industries, including marketing and technical services. Twelve credit hours listed as emphasis areas in the core curriculum qualify a student as a participant in one of the two areas. The area of interest could be explored in more depth through use of the remaining elective credits.

Successful completion of the curriculum leads to a Bachelor of Science degree in Wood Utilization. Graduate studies leading to the Master of Science, Master of Forestry, and Doctor of Philosophy degrees are also offered.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BOT 205 Plant Form and Function	4 (3,3)
CH 101 General Chemistry	4 (3,3)	CH 102 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	CPSC 110 Elem. Comp. Prog.	3 (3,0)
FOR 101 Introduction to Forestry	1 (1,0)	EG 105 Engineering Drawing	2 (1,3)
MTHSC 106 Cal. of One Var. I	4 (4,0)	ENGL 102 Composition II	3 (3,0)
POSC 101 American National Govt.	3 (3,0)	FOR 102 Introduction to Forestry	1 (1,0)
	18		17

SOPHOMORE YEAR

FOR 205 Dendrology	4 (3,3)	ECON 212 Principles of Economics	3 (3,0)
FOR 221 Wood Properties I	3 (2,3)	ENGL 301 Public Speaking	3 (3,0)
PHYS 207 General Physics I	4 (3,2)	FOR 222 Wood Properties II	3 (2,3)
Literature Requirement[1]	3	PHYS 208 General Physics II	4 (3,2)
Elective	3	Elective	4
	17		17

FORESTRY SUMMER CAMP

FOR 253 Forest Mensuration	4
FOR 254 Forest Products	1
FOR 255 Secondary Wood Products	1
	6

JUNIOR YEAR

ENGL 314 Technical Writing	3 (3,0)	FOR 304 Forest Economics	3 (3,0)
EXST 301 Introductory Statistics	3 (2,2)	FOR 306 Wood and Wood Fiber Indentification	2 (1,3)
FOR 325 Wood Chemistry	3 (2,3)	FOR 310 Silviculture	4 (3,3)
FOR 327 Wood Processing I	3 (2,3)	FOR 328 Wood Processing II	3 (2,3)
Emphasis Area	5	Emphasis Area	6
	17		18

SENIOR YEAR

FOR 401 Harv. For. Products I	2 (1,3)	FOR 411 Harv. For. Products II	3 (2,3)
FOR 420 Forest Products	3 (2,3)	FOR 430 Composite Wood Materials	3 (2,3)
FOR 429 Wood Design	3 (2,3)	FOR 433 Merchandising of For. Prod.	3 (3,0)
MGT 304 Stat. Quality Control	3 (3,0)	FOR 434 Foreign Woods and Their Prop.	2 (1,3)
Elective	6	Elective	6
	17		17

144 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

Notes: The emphasis areas are Wood Industries Management, Wood Science, and Forest Management. The student selects one of these and in consultation with an academic adviser schedules approved courses for that particular emphasis area.

No credit will be allowed in the Wood Utilization curriculum for ENGL 100 to satisfy requirements for graduation.

PARKS, RECREATION, AND TOURISM MANAGEMENT

The curriculum in Parks, Recreation, and Tourism Management prepares students for a variety of careers in public and private leisure-service agencies. The undergraduate curriculum is designed to provide a broad exposure to the social, physical and biological sciences as well as to develop the basic knowledge and skills required to manage and administer leisure-service resources.

Flexibility within the curriculum is achieved by permitting the student to select coursework from among several emphasis areas that include Community Leisure Services, Recreation Resource Management, Therapeutic Recreation, and Travel and Tourism. The latitude in selection permits maximum accommodation of the individual student's interests and professional career objectives. Students may complete requirements for a minor which is appropriate to his/her emphasis area.

Graduate study leading to a Master of Recreation and Park Administration and a Master of Science are also offered.

The Parks, Recreation, and Tourism Management program is accredited by the National Council on Accreditation of the National Recreation and Parks Association.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	RPA 203 Personal and Community Health	3 (3,0)
RPA 101 Introduction to Leisure Services	3 (3,0)	RPA 205 Leisure Programs I	3 (2,3)
History Requirement[2]	3	Social Science/Humanities Requirement[3]	3
Elective	1	Elective	1
	17		17

SOPHOMORE YEAR

PSYCH 201 Introduction to Psychology	3 (3,0)	CPSC 120 Introduction to Information Processing Systems	3 (3,0)
RPA 102 Issues in Leisure Services	3 (3,0)	ECON 200 Economic Concepts[5]	3 (3,0)
RPA 206 Leisure Programs II	1 (0,3)	RPA 207 Leisure Programs III	1 (0,3)
Literature Requirement[1]	3	RPA 311 Therapeutic Recreation	3 (3,0)
Science Requirement[4]	4	Communications/Language Requirement[6]	3
Social Science/Humanities Requirement[3]	3	Elective	3
	17		16

JUNIOR YEAR

RPA 308 Leadership and Group Processes in Recreation	3 (3,0)	RPA 321 Recreation Administration	3 (3,0)
RPA 330 Introduction to Environmental Interpretation	3 (3,0)	Emphasis Area	8
Communication/Language Requirement[6]	3	Elective	4
Emphasis Area	6		15
	15		

SUMMER

RPA 405 Field Training in Recreation 8 (0,24)

SENIOR YEAR

RPA 409 Methods of Recreation Research I	3 (3,0)	RPA 410 Methods of Recreation Research II	3 (3,0)
Emphasis Area	9	Emphasis Area	9
Elective	3	Elective	3
	15		15

135 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Select from history course list. (See adviser).
[3]Select from sociology, rural sociology, humanities, music, philosophy-logic, visual arts, political science, geography, anthropology, and history
[4]Select from science course list. (See adviser).
[5]Student may take ECON 211 plus 212 in lieu of ECON 200, with three of these six hours allocated to electives
[6]Select from oral or written communication or foreign language.
The emphasis areas in the Department of Parks, Recreation, and Tourism Management include Community Leisure Services, Recreation Resource Management, Therapeutic Recreation, and Travel and Tourism. The student selects one of these areas and in consultation with an academic adviser schedules the required and approved courses for that particular emphasis area.

COLLEGE OF LIBERAL ARTS

The College of Liberal Arts, in addition to its six major curricula leading to the degree of Bachelor of Arts, makes indispensible contributions to the programs of all other divisions of the University, including nearly all the instruction in the humanities and the social sciences.

Single or double major concentrations may be elected in English, History, Modern Languages, Political Science, Psychology, and Sociology; minor concentrations are offered in these disciplines, in American Studies, Communications, Dramatic Arts, International Studies, Music, Philosophy, Spanish-American Area Studies, and Speech, Religion and Writing. In cooperation with other colleges of the University minor concentrations are also available in Accounting, Biology, Chemistry, Computer Science, Economics, Fine Arts, Geology, Mathematical Sciences, and Physics. Supporting work is offered in interdisciplinary humanistic studies. A student who elects a double major concentration will not be required to complete a minor concentration.

The College of Liberal Arts offers programs leading to graduate degrees in English and History.

BACHELOR OF ARTS CURRICULUM

The curriculum leading to the degree of Bachelor of Arts is designed to meet the needs of students who desire a broad general education, with emphasis upon the humanities and the social sciences, as a preparation for intelligent citizenship, for general commercial and industrial life, for government service, and for teaching. This curriculum also provides excellent background for the study of law, journalism, or medicine.

As soon as feasible in his college career, and not later than the end of the sophomore year, the student seeking the Bachelor of Arts degree will select a major and a minor field of concentration from the following areas (or a double major from the list of possible majors):

Majors
English
History
Modern Languages
Political Science
Psychology
Sociology

Minors
Accounting
American Studies
Biological Sciences
Chemistry
Cluster Minor
Communications
Computer Science
Dramatic Arts
Economics
English
Fine Arts
Geology
History
International Studies
Mathematical Sciences
Modern Languages
Music
Philosophy
Physics
Political Science
Psychology
Religion
Sociology
Spanish-American Area Studies
Speech
Writing

To achieve depth as well as breadth in one's educational experience, a student selects a major concentration consisting of at least 24 semester hours from courses above the sophomore level. A student also chooses a minor concentration consisting of at least 15 additional semester hours. Courses satisfying the student's major concentration may *not* also be included in the minor. The minor field of study may be selected from the approved list of minors within the College of Liberal Arts and of minors outside the College. A second major concentration (a double major) may substitute for the minor providing all requirements are fulfilled for each major. A request for a double major outside the College of Liberal Arts must be initiated by the student's adviser, routed through the department head to the dean, who arranges the approval of the cooperating college's dean.

The total number of semester credits required for the degree is 130; of these, at least 12 credits must be earned in humanities courses numbered 300 or higher and at least 12 credits in social science courses numbered 300 or higher. The humanities are for this purpose considered to include art and architectural history, English, languages, music, philosophy, and religion as well as courses entitled humanities; the social sciences are here considered to include anthropology, economics, geography, history, political science, psychology, and sociology.

Students in the Bachelor of Arts program who expect to teach in the public schools may elect education courses required for teaching certificates by the South Carolina State Department of Education, such courses to be approved by their own department advisers.

BASIC CURRICULUM

FRESHMAN YEAR

First Semester		Second Semester	
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
MTHSC 101 Finite Probability	3 (3,0)	MTHSC 102 Intro. to Math. Anal.[3]	3 (3,0)
Foreign Language	4 (3,1)	Foreign Language	4 (3,1)
Natural Science[2]	4	Natural Science[2]	4
	17		17

SOPHOMORE YEAR

Foreign Language	3 (3,0)	Foreign Language	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Approved Elective	12	Approved Elective	10
	18		16

JUNIOR YEAR

Major and Minor Areas	9	Major and Minor Areas	12
Approved Elective	6	Approved Elective	3
	15		15

SENIOR YEAR

Major and Minor Areas	9	Major and Minor Areas	9
Approved Elective	8	Approved Elective	6
	17		15

130 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]A two-semester sequence of the same natural science (astronomy, biology, chemistry, geology, or physics) totaling at least 8 semester credits, including the appropriate laboratory course.

[3]Students may substitute MTHSC 106 for the 101-102 requirements. Sociology majors must take MTHSC 101 and 203, not 102 or 106.

MAJOR CURRICULA IN THE COLLEGE OF LIBERAL ARTS

ENGLISH

The program of study for a major concentration in English consists of courses stipulated in the basic curriculum[1] for the Bachelor of Arts and 24 semester credits of English, arranged as follows:

Group I ENGL 411.
Group II Three credits from ENGL 405, 407, 408, 409, 410, 412, 413, 414.
Group III Three credits from ENGL 406, 415, 416, 417, 418.
Group IV Three credits from ENGL 422, 423, 424, 425.
Group V Twelve additional credits above the sophomore level, including at least 6 credits from the 400 level.[2]

Rising junior students with grade-point ratios of 3.3 or higher may, with the advice and consent of departmental advisers and the English Curriculum Committee, propose different arrangements of the 24 upper-level English credits required. Candidates are expected to demonstrate the logic and thematic unity of their proposals. Continued approval will require that an overall grade-point ratio of 3.3 be maintained.

The Department requires certification of proficiency in composition for all of its majors. Proficiency may be demonstrated in any of the following ways:

1. By passing ENGL 101-102 with no grade lower than B; or, if placement credit is awarded for 101 and/or 102, by passing the required sophomore literature courses with no grade lower than B.

2. By passing ENGL 304. (If taken to satisfy the proficiency requirement, however, ENGL 304 may not be included in Group V above.)

3. In unusual circumstances, by special examination.

English majors must complete HIST 361, 363, and the third year of a foreign language or the second year of two foreign languages.

Additional approved electives are added as necessary to meet the minimum number of 130 credits for graduation.

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[1]The Department recommends but does not insist that English majors take ENGL 203 and 204 to satisfy the sophomore literature requirement.

[2]In no case may courses numbered lower than 300 be included in Group V; nor may any course be used toward satisfaction of both major and minor requirements.

HISTORY

The recommended program of study consists of the required courses in the Bachelor of Arts curriculum; completion of the third year of a foreign language; 30 additional credits in history, including at least two courses at the 400 level, selected with the advice and consent of a departmental adviser and arranged to suit the academic interests of the student. Additional approved electives are added as needed to meet the minimum of 130 semester credits required for graduation.

MODERN LANGUAGES

A student may elect a major concentration in a single language, a double major in two languages, or a double major combining a language major with a major outside the department. All Modern Language majors will choose one of the following options:

Option A, designed to prepare the student to continue education in graduate school or to provide background for other professional language careers, requires the courses specified below plus 6 credits in history at the 300-400 level, selected with the approval of the Head of the Department of Languages.

Option B, designed to prepare for teaching in secondary schools, requires the courses specified below plus coursework in education sufficient to meet certification requirements.

Option C, designed to prepare for a career in business. Modern Language majors seeking employment with multinational firms in the United States and overseas, or pursuing graduate degrees in international business studies, economics, or agricultural economics, may have one of the following:

(a) A double major with Economics.

(b) A Cluster Minor in Administration.

(c) A minor in Accounting, International Studies, or Spanish-American Area Studies.

All Modern Language majors must complete the stipulated courses in the basic Bachelor of Arts curriculum.

French All options require FR 205 and 209 plus 24-semester credits in French at the 300-400 level appropriate to the option and approved by the Head of the department.

German All options require 24-semester credits in German at the 300-400 level appropriate to the option and approved by the Head of the department.

Spanish All options require SPAN 205 and 305 plus 24-semester credit in Spanish at the 300-400 level appropriate to the option and approved by the Head of the department.

POLITICAL SCIENCE

For a major concentration in Political Science, the recommended program of study consists of the required courses in the Bachelor of Arts curriculum; POSC 101, 201, 341, and 21 semester hours of political science drawn from at least four of these fields:

1. American Government—POSC 302, 403, 405, 406, 409.
2. Comparative Governments—POSC 371, 372, 373, 475, 476.
3. International Relations—POSC 361, 462, 463, 465.
4. Political Behavior—POSC 442, 443, 454.
5. Political Thought—POSC 351, 352, 453.
6. Public Administration—POSC 321, 422, 423, 424, 425, 427, 428.
7. Public Law—POSC 432, 433, 434, 435.

With the department head's approval, POSC 300 and 482 may be appropriately applied to one of the seven areas. Additional approved electives are added as needed to meet the minimum of 130 semester hours required for graduation.

PSYCHOLOGY

The recommended program of study for a major concentration in Psychology consists of the required courses in the Bachelor of Arts curriculum; PSYCH 201, 210-211, 310; and 24 additional credits in psychology including at least two courses at the 400 level and selected as follows:

At least one course from each of the following groups and 8 additional credits at the 300-400 level.

Group I PSYCH 320-321, 322-323, 424-425.
Group II PSYCH 330, 333, 415.
Group III PSYCH 340, 343, 345.
Group IV PSYCH 352, 355, 364.
Group V PSYCH 370, 471, 483.

Zoology 470 may be included in lieu of one of the 300- or 400-level elective psychology courses.

SOCIOLOGY

The Sociology major consists of the required courses in the Bachelor of Arts curriculum (Sociology majors must take MTHSC 203), SOC 201, 404, SOC (RS) 303, and 24 credits from one of the following concentrations:

General Sociology Six hours from among SOC 350, 351, 460, and 461; 6 hours from among SOC 330, 331, 431, and SOC (RS) 371; and 12 hours from among all courses offered in the Department of Sociology not already taken to fulfill requirements.

Social Service Sociology SOC 380, 381, 382, and SOC (RS) 495; 12 hours from among SOC 383, 392, 394, 395, 480, 481, and PSYCH 488.

Criminal Justice Sociology SOC 390, 393, 490, SOC (RS) 495; 12 hours from among SOC 351, 391, 392, 430, 460, HIST 496, POSC 434, 435; and one three-hour course from among all courses offered in the Department not taken above.

Community and Population Studies (Offered jointly with Rural Sociology) Twelve hours from among CAPL 411, SOC (RS) 359, 371, 401, 471; 12 hours from among AGEC (CRD) 411, 412, CAPL 472, 473, CRD 357, MTHSC 301, SOC 330, 331, 381, 431, SOC (RS) 403; and one three-hour course under the option requirements not already taken. (RS 301 may be substituted for SOC 201 by Community and Rural Development majors.)

At least 9 of the total hours in the major must be 400-level sociology and/or rural sociology courses. Additional approved electives are added as needed to meet the minimum of 130 semester credits required for graduation.

MINOR CONCENTRATIONS

Students seeking the Bachelor of Arts degree may choose one of several minor concentrations available. The requirements for each area are detailed below.

Accounting A minor concentration in Accounting requires ACCT 201, 202, 301, 302, and 6 additional credits in accounting courses numbered higher than 201.

American Studies A minor concentration in American Studies requires AMST 300, 400 and two courses from each of the following groups:

Group I ENGL 351, 353, 355, 357, 425, 455, HIST 306, 308, 314, 315, 400.
Group II ANTH 320, ECON 421, ENGL 369, MUS 311, POSC 433, 453, 482, REL 310, RS 301, SOC 331, 460.

English majors seeking a minor concentration in American Studies must select history courses from Group I; History majors seeking a minor concentration in American Studies must select English courses from Group I. Courses may be substituted for the courses in Groups I and II only with the approval of the American Studies adviser. In addition, the American Studies adviser must approve the minor programs of all students seeking the minor concentration in American Studies.

Biological Science A minor concentration in Biological Science requires 15 semester credits in the biological sciences numbered higher than 200.

Chemistry A minor concentration in Chemistry requires CH 101, 102, and 15 additional credits in chemistry, the courses to be selected in consultation with the Department of Chemistry.

Cluster Minor This minor concentration is designed to allow students a somewhat wider choice of course materials than is possible with the conventional subject-matter minor. The general requirement for the Cluster Minor is 15 semester credits in courses numbered higher than 300, except where noted differently, chosen according to one of the plans listed below. Courses within the student's major area may not be included in the Cluster Minor.

Group I Social Sciences—anthropology, economics, geography, history, political science, psychology, sociology.
Group II Philosophy and Religion.
Group III Administration—accounting, economics, finance, management, law.
Group IV Life Sciences[1]—biochemistry, botany, genetics, microbiology, zoology.
Group V Physical Sciences[1]—chemistry, geology, physics.

Communications A minor concentration in communications requires 18 credits distributed as follows:

General Communications Option ENGL 231, 304, and either 360 or 361, PHIL 102; 6 approved elective credits.

Advertising Option AGEC 351, ENGL 231 or 304, GC 104, PSYCH 330; 6 approved elective credits.

[1]No course in the 100 series is acceptable toward the Cluster Minor and not more than two courses in the 200 series.

Commerce Option AGEC 351 or INED 496, ENGL 231 or 304, 360 or 361, MGT 301; 6 approved elective credits.

Politics Option ENGL 304 and either 360 or 361, POSC 341, 443; 6 approved elective credits.

Elective credits are approved by the Head of the Department of English or his representative.

Computer Science A minor in Computer Science requires CPSC 110 or 120, 130, 210, 230, and two additional computer science courses numbered 300 or higher.

Dramatic Arts The minor concentration in Dramatic Arts requires ENGL 378 and 15 additional semester credits arranged as follows:

Group I Dramatic Literature—At least 3 credits from these courses: ENGL 404, 410, 411, 430.

Group II Production—9 credits from the following, including at least one sequence: ENGL 375 and 475, 376 and 476, 377 and 477.

Group III Elective—3 additional credits from courses listed above.

Economics A minor concentration in Economics requires ECON 314, 407, and 9 additional credits from economics courses numbered 300 or higher.

English A minor concentration in English requires 15 semester credits in English above the sophomore level, arranged as follows:

Group I ENGL 411.

Group II Three credits from ENGL 405, 406, 407, 408, 409, 410, 412, 413, 414, 415, 416, 417, 418.

Group III Three credits from ENGL 422, 423, 424, 425.

Group IV Six additional credits above the sophomore level, including at least 3 credits from the 400-level.

Department certification of proficiency in composition is required. (See discussion under major concentration in English.)

Fine Arts The minor concentration in Fine Arts requires HUM 301[1], 302[1] and 15 semester credits from the following courses, of which at least 9 must be earned in courses numbered 300 or higher, and no more than 9 in any discipline selected: Art and Architectural History (all courses); ENGL 345, 346, 357, 363, 375, 376, 378, 379, 445, 446; HUM 305, 306, 309; LS 190; MUS 151, 152, 205, 206, 210, 251, 252, 305, 306, 311, 315, 316, 362, 365, 421, 422; Visual Arts (all courses).

Geology A minor concentration in Geology requires 15 semester credits from the following courses: GEOL 101, 102, 306, 309, 402, 403, 404, 411.

History A minor concentration in History requires HIST 101, 102, and 15 additional credits drawn from 300- and 400-level history courses. At least one 400-level course must be included.

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[1]Students transferring from the College of Architecture may substitute CADS 151-152 for HUM 301-302.

International Studies The International Studies minor requires 15 semester credits in 300- and 400-level courses within the framework of political science, modern languages, and economics as outlined below. A minimum of three credit hours must be included from each of Areas I, II and III; however, since courses within a student's major shall not count toward a minor, Geography will be the third area for majors in the above three disciplines. The remaining six credits may be selected from Areas I, II, III, or IV.

Area I Economics—ECON 404, 410, 412.
Area II Languages—FR 305, 306, 409, GER 305, 411, SPAN 305, 306, 409.
Area III Political Science—POSC 361, 462, 465.
Area IV Geography—GEOG, 301, 302.

Mathematical Sciences A minor concentration in Mathematical Sciences requires MTHSC 208, 301, and 9 additional credits in mathematical sciences courses numbered 300 or higher.

Modern Languages A minor concentration in Modern Languages requires 15 semester credits in one modern language from courses on the 300- and 400-levels, including at least one course on the 400 level. In addition, a minor concentration in French requires FR 205, and a minor concentration in Spanish requires SPAN 205.

Music A minor concentration in Music requires MUS 151, 152, 205, 206, two credits in ensemble (MUS 361, 362, or 365), and 11 additional credits from these courses: MUS 210, 251, 252, 305, 306, 311, 315, 316, 421, 422. Two additional ensemble credits may be included.

Philosophy A minor concentration in Philosophy requires 6 credits from PHIL 101, 102, 203, and 15 semester credits from the following courses: PHIL 303, 304, 315, 316, 317, 318, 325, 344.

Physics A minor concentration in Physics requires PHYS 122 and 15 additional semester credits in physics, including PHYS 221, 222.

Political Science A minor concentration in Political Science requires POSC 101, 201, and 15 additional semester credits selected from at least three of the fields of political science. At least one 400-level course must be included.

Psychology A minor concentration in Psychology requires PSYCH 201, 210-211 (except for Sociology majors) and 15 semester credits from 300-and 400-level psychology courses. At least one 400-level course must be included.

Religion A minor concentration in Religion requires REL 300 plus 15 credits in religion courses numbered above 300, including at least one course numbered above 400. PHIL 303 and SOC 432 may be included in the minor, provided that they are not counted towards meeting requirements for a major or minors in those fields.

Sociology A minor concentration in Sociology requires SOC 201 and 15 credits from sociology and rural sociology courses numbered 300 or higher. At least one 400-level course must be included.

Spanish-American Area Studies A minor concentration in Spanish-American Area Studies requires the equivalent of SPAN 202, plus 15 semester credits distributed as follows: 6 credits from HIST 340, 341, 342, 440; 6 credits from SPAN 305, 306, 308, 311; 3 credits from AGRIC 301, 401, ECON 410, POSC 475.

Speech A minor concentration in Speech requires ENGL 366, and 12 additional semester credits arranged as follows:

Group I Performance—3-6 credits from ENGL 301, 363, 368.
Group II Theory—3-6 credits from ENGL 360, 361, 364.
Group III Elective—At least 3 additional credits from ENGL 260, 362, or any of the courses listed above not used to fill the minor requirement.

Writing A minor concentration in writing requires 15 credits as follows:

Business and Technical Option AGEC 351 or GC 104, CPSC 120, ENGL 304 or 314, 392, 490.

Journalism Option ENGL 231, 333, 334, 335; one of the following electives: AGEC 351, CPSC 120, GC 104, ENGL 217, 260, 301, 304, 312, 314, INED 496, PHIL 102; any course approved by the Head of the English Department.

Writing Pedagogy Option ENGL 312, 400, 403, 404; elective (3 credits), any 300- or 400-level writing course offered by the English Department.

Creative Writing Options

Drama ENGL 347, 447 (6 credits), 430; one of the following electives: ENGL 312, 378, 410, 411.

Fiction ENGL 345, 445 (6 credits), 432; one of the following electives: ENGL 312, 418, 425, 426.

Poetry ENGL 346, 446 (6 credits), 431; one of the following electives: ENGL 312, 413, 416, 417.

APPROVED ELECTIVES FOR STUDENTS IN THE COLLEGE OF LIBERAL ARTS

Students majoring in the College of Liberal Arts are free to choose as electives any course in the *Announcements* or approved by the University's Undergraduate Curriculum Committee except ENGL 100, MTHSC 100, 115, 116, 215, or 216. Class advisers should monitor elective courses to ensure that the student's selection is proper for a sound educational program, keeping in mind that the ultimate responsibility for elective courses rests with the student.

COLLEGE OF NURSING

Clemson University College of Nursing provides baccalaureate and master's degree programs to prepare for careers in nursing. Opportunities within the College of Nursing and elsewhere in the University combine to provide a setting which enables students to fulfill a wide range of educational objectives. Each student enrolled in nursing is encouraged to recognize these opportunities and partake of them.

The four-year program leading to the Bachelor of Science in Nursing is designed to prepare students for the practice of professional nursing in a variety of settings, such as hospitals, industry, clinics, and public health agencies. This curriculum provides an unlimited opportunity for men and women to attain sound preparation for professional nursing and a foundation for graduate study in nursing. During the first two years, emphasis is upon liberal arts and basic science courses arranged sequentially to provide a foundation for the nursing major. In junior and senior years the emphasis is upon the study of nursing. However, liberal arts courses can be taken simultaneously with the study of nursing throughout the entire program.

Clinical nursing experiences under the guidance of the College of Nursing faculty take place with clients in multiple hospitals, clinics, and other health agencies. These community resources enable students of nursing to enjoy a variety of clinical facilities and assist faculty to provide quality clinical instruction. Some of the clinical facilities utilized are Greenville Hospital System, Anderson Memorial Hospital, Easley Baptist Hospital, Oakmont Nursing Center, Lila Doyle Annex-Oconee Memorial Hospital, Anderson County Head-Start Center, Anderson Memorial Hospital Child-Development Center, Clemson Day-Care Center, Appalachian Health Department, Districts I and II, and local public health agencies. When functioning within a clinical agency, students are expected to conform to the policies in effect within that agency.

Students are required to achieve a grade of C in each nursing course attempted and demonstrate satisfactory performance in each clinical laboratory to be eligible for succeeding nursing courses.

All students enrolled in the College of Nursing must carry throughout the period of their assignments a current and valid student nurse's professional liability insurance policy with minimum limits of liability of $200,000 per occurrence and $600,000 in aggregate and provide documentation thereof to the Dean of the College of Nursing. No student will be allowed to participate in clinical learning activities without the above insurance coverage.

ENTRANCE REQUIREMENTS

To conserve University resources and to facilitate admission of students who can achieve at an appropriate level in the program, admission is selective. Consideration is given to performance in secondary school

and on the College Board Examination (SAT). Those seeking admission are advised to apply to the University early in the fall of the senior year in high school.

BACHELOR OF SCIENCE IN NURSING

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I[1]	3 (3,0)	BIOL 104 General Biology II[1]	3 (3,0)
CH 101 General Chemistry	4 (3,3)	CH 102 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 102 Intro. to Math. Analysis	3 (3,0)	SOC 201 Introduction to Sociology	3 (3,0)
PYSCH 201 Introduction to Psychology	3 (3,0)	Elective	4
	16		17

SOPHOMORE YEAR

BIOCH 210 Elementary Biochemistry	4 (3,3)	MICRO 205 Introductory Microbiology[3]	4 (3,3)
NURS 210 Introduction to Nursing I	3 (2,3)	NURS 211 Introduction to Nursing II	3 (2,3)
PSYCH 340 Life Span. Dev. Psychology	3 (3,0)	NURS 230 Professionalism in Nurs. I	2 (2,0)
ZOOL 222 Human Anatomy	4 (3,3)	SOC 311 The Family	3 (3,0)
Elective[2]	3	ZOOL 223 Human Physiology	4 (3,3)
	17		16

JUNIOR YEAR

EXST 301 Introductory Statistics	3 (2,2)	CPSC 120 Intro. to Info. Processing Systems	3 (3,0)
NURS 320 Nursing During Alterations in Life Patterns I	2 (2,0)	NURS 330 Professionalism in Nurs. II	2 (2,0)
NURS 321 Promotion of Health I	2 (2,0)	NURS 340 Nursing During Alterations in Life Patterns II	2 (2,0)
NURS 322 Clinical Nursing I	2 (0,6)	NURS 341 Promotion of Health II	2 (2,0)
NURS 323 Clinical Nursing II	2 (0,6)	NURS 342 Clinical Nursing IV	2 (0,6)
NURS 324 Clinical Nursing III	1 (0,3)	NURS 343 Clinical Nursing V	2 (0,6)
NUTR 451 Human Nutrition	3 (3,0)	NURS 344 Clinical Nursing VI	1 (0,3)
PSYCH 352 Social Psychology	3 (3,0)	Elective[2]	3
	18		17

SENIOR YEAR

MGT 307 Personnel Management or SOC 430 Sociology of Org.	3 (3,0)	NURS 460 Complex Nurs. Interven. II	2 (2,0)
NURS 415 Promotion of Health III	2 (2,0)	NURS 461 Complex Clinical Nurs. III	2 (0,6)
NURS 416 Complex Clinical Nurs. V	1 (0,3)	NURS 462 Complex Clinical Nurs. IV	2 (0,6)
NURS 430 Professionalism in Nurs. III	2 (2,0)	Nursing Requirement[4]	4
NURS 450 Complex Nurs. Intervention I	2 (2,0)	Elective	6
NURS 451 Complex Clinical Nurs. I	2 (0,6)		16
NURS 452 Complex Clinical Nurs. II	2 (0,6)		
Elective[2]	3		
	17		

134 Total Semester Hours

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[1]BIOL 110 and 111 may be substituted for BIOL 103 and 104.
[2]To include 6 hours of literature and 3 hours selected from the following: humanities, music, philosophy, religion.
[3]MICRO 305 may be substituted for MICRO 205.
[4]Select from the following: NURS 426, 431, 432, 434, 435, 437, 438, 439, 440, 441, 442.
Notes:
a. NURS 230, 300, and 330 are open to nonmajors with permission of instructors.
b. A minimum of C is required in each nursing course. Students may repeat a nursing course one time only.
c. A minimum grade-point ratio of 2.0, based on courses required the first two years of the curriculum, excluding electives, is required of all Nursing majors in order to enroll in nursing courses numbered 300 and above.
d. Students enrolled in ROTC may substitute 10 semester hours of military science or aerospace studies for 10 semester hours of free electives.

COLLEGE OF SCIENCES

The College of Sciences, attuned to the times and its needs, offers ten major curricula leading to the degree of Bachelor of Science. These are Biochemistry, Botany, Chemistry, Computer Science, Geology, Mathematical Sciences, Medical Technology, Microbiology, Physics, and Zoology.

In addition, the Bachelor of Arts degree is offered with a major emphasis in Botany, Chemistry, Geology, Mathematical Sciences, Physics, and Zoology.

Not only are the departments in the College of Sciences concerned with their own programs, but they work closely with the other academic departments in the University. This interweaving of the physical, mathematical and biological sciences with other disciplines, such as economics, engineering, management and others allows students great flexibility and responsibility in designing their own programs.

BACHELOR OF ARTS CURRICULA

The curricula leading to the Bachelor of Arts degree are designed to meet the needs of those students who desire a broad general education. The first two years are spent in introductory work in several areas in order to give the student breadth of view. This background enables the student to select intelligently the major and minor fields of concentration. The major areas in the College of Sciences are Botany, Chemistry, Geology, Mathematical Sciences, Physics, and Zoology.

A student has a large degree of flexibility and responsibility in designing the minor area from any departments in the University. All minors listed and described on pages 136-139 under the College of Liberal Arts are approved for this program as well as any of the natural sciences and mathematical sciences. The courses for these minors are to be selected in consultation with the appropriate department. The minor fields are as follows:

Accounting
American Studies
Biochemistry
Botany
Chemistry
Cluster Minor
Communications
Computer Science
Dramatic Arts
Economics
English
Fine Arts
Geology
History
International Studies
Mathematical Sciences
Microbiology
Modern Languages
Music
Philosophy
Physics
Political Science
Psychology
Religion
Sociology
Spanish-American Area Studies
Speech
Zoology
Writing

Note: No curriculum in the College of Sciences leading to the Bachelor of Arts degree will allow credit for ENGL 100, MTHSC 100, 104 or 105 to be used to satisfy requirements for graduation.

To fulfill requirements for a major concentration, a student takes 24 semester hours credit from courses above the sophomore level including or in addition to certain courses specified by the major department; the minor concentration requires 15 credits from courses above the sophomore level. In some major and minor disciplines, certain prescribed courses at the sophomore level are counted toward the 24 and 15 credit-hour requirements.

MAJOR FIELDS OF CONCENTRATION

BOTANY

The Bachelor of Arts in Botany provides a strong foundation in Botany and a liberal education encompassing the humanities and the social sciences. For a major concentration, a recommended program of study is shown below, with 131-133 hours required for graduation.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Principles of Biology I	5 (4,3)	BIOL 111 Principles of Biology II	5 (4,3)
CH 101 General Chemistry	4 (3,3)	CH 102 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
Foreign Language Requirement[2]	4 (3,1)	Foreign Language Requirement[2]	4 (3,1)
	16		16

SOPHOMORE YEAR

BIOCH 210 Elementary Biochemistry	4 (3,3)	BOT 202 Survey of the Plant Kingdom[3]	4 (3,3)
BOT 201 Field Botany[3]	4 (2,4)	PHIL 325 Philosophy of Science	3 (3,0)
Mathematics Requirement[4]	3-4	Mathematics Requirement[4]	3-4
Literature Requirement[1]	3	Literature Requirement[1]	3
Foreign Language Requirement[2]	3 (3,0)	Foreign Language Requirement[2]	3 (3,0)
	17-18		16-17

JUNIOR YEAR

PHYS 207 General Physics I	4 (3,2)	PHYS 208 General Physics II	4 (3,2)
HIST 172 Western Civilization	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
Major	4	Major	4
Minor[5]	3	Minor[5]	3
Humanistic-Social Requirement	3	Humanistic-Social Requirement	3
	17		17

SENIOR YEAR

Major	4	Major	4
Minor[5]	6	Minor[5]	3
Elective	6	Elective	9
	16		16

131-133 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Four semesters of the same language are required.
[3]BOT 201, 202 count toward the required 24 hours of the Botany major.
[4]Mathematics requirement to be selected from MTHSC 101, 203 or 106, 108.
[5]Minors, in addition to those listed under Bachelor of Arts Curricula in the College of Sciences, may be taken in the College of Agricultural Sciences or in the College of Forest and Recreation Resources, such as Agronomy; Entomology; Forestry; Horticulture; Parks, Recreation and Tourism Management; Plant Pathology; and Wildlife and Fisheries Biology or a cluster minor using these disciplines.

BASIC FRESHMAN YEAR FOR CHEMISTRY AND GEOLOGY PROGRAMS

For the Bachelor of Arts degree, Chemistry Requires 130 semester hours, and Geology requires 128 semester hours.

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry[1]	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
Modern Language	4 (3,1)	Modern Language	4 (3,1)
	15		15

[1]Geology majors may substitute CH 102.

CHEMISTRY

SOPHOMORE YEAR

First Semester		Second Semester	
CH 223 Organic Chemistry[2]	3 (3,0)	CH 224 Organic Chemistry[2]	3 (3,0)
CH 227 Organic Chemistry Lab.	1 (0,3)	CH 228 Organic Chemistry Lab.	1 (0,3)
MTHSC 206 Cal. of Sev. Var.	4 (4,0)	HIST 172 Western Civilization	3 (3,0)
PHYS 122 Phys. with Cal. I	3 (3,0)	PHYS 221 Phys. with Cal. II	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Modern Language	3 (3,0)	Modern Language	3 (3,0)
	17		16

JUNIOR YEAR

HIST 173 Western Civilization	3 (3,0)	Chemistry Elective	4
Chemistry Elective	4	Minor	6
Minor	3	Elective	6
Elective	7		16
	17		

SENIOR YEAR

Chemistry Elective	4	Chemistry Elective	4
Minor	3	Minor	3
Elective	10	Elective	10
	17		17

130 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]CH 223, 224 will count towards the 24 hours of the Chemistry major.

GEOLOGY

SOPHOMORE YEAR

First Semester		Second Semester	
GEOL 101 Physical Geology	4 (3,2)	GEOL 102 Historical Geology	4 (3,3)
MTHSC 206 Cal. of Sev. Var.	4 (4,0)	HIST 172 Western Civilization	3 (3,0)
Modern Language	3 (3,0)	Literature Requirement[1]	3
Literature Requirement[1]	3	Modern Language	3 (3,0)
Elective	3	Elective	4
	17		17

JUNIOR YEAR

GEOL 306 Mineralogy	3 (2,3)	GEOL 309 Petrology	3 (2,3)
HIST 173 Western Civilization	3 (3,0)	Geology Elective	3
Geology Elective	3	Humanities Elective	3
Humanities Elective	3	Minor	3
Minor	3	Elective	4
Elective	3		16
	18		

SENIOR YEAR

GEOL 402 Structural Geology	3 (2,2)	GEOL 404 Economic Geology	3 (3,0)
Geology Elective	3	Geology Elective	3
Minor	6	Minor	3
Social Science Elective	3	Social Science Elective	3
	15	Elective	3
			15

128 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

MATHEMATICAL SCIENCES

For a major concentration a recommended program of study is shown below, with 130 semester hours required for graduation.

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 110 Elem. Comp. Prog.	3 (3,0)	ENGL 102 Composition II	3 (3,0)
ENGL 101 Composition I	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
MTHSC 150 Intro. to Math. Sci.	1 (1,0)	Foreign Language[3]	4 (3,1)
Foreign Language[3]	4 (3,1)	Elective	3
	15		17

SOPHOMORE YEAR

HIST 173 Western Civilization	3 (3,0)	ECON 200 Economic Concepts	3 (3,0)
MTHSC 206 Cal. of Sev. Var.	4 (4,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	MTHSC 311 Linear Algebra	3 (3,0)
Foreign Language[3]	3 (3,0)	Literature Requirement[1]	3
Literature Requirement[1]	3	Elective[2]	4
	16		17

JUNIOR YEAR

MTHSC 350 Intro. to Math. Models	3 (3,0)	CAAH 303 Evol. of Vis. Arts I	3 (3,0)
Minor	3	or MUS 210 Music Appreciation	3 (3,0)
Natural Science Elective[2]	4	Mathematical Sciences Elective[4]	3
Social Science Elective[2]	3	Minor	3
Elective	3	Natural Science Elective[2]	4
	16	Social Science Elective[2]	3
			16

SENIOR YEAR

MTHSC 412 Intro. to Mod. Algebra	3 (3,0)	MTHSC 454 Adv. Calculus II	3 (3,0)
or MTHSC 419 Discrete Math. Structures I	3 (3,0)	or MTHSC 464 Math. Analysis II	3 (3,0)
MTHSC 453 Adv. Calculus I	3 (3,0)	Humanities[2]	3
or MTHSC 463 Math. Analysis I	3 (3,0)	Mathematical Sciences Elective[4]	3
Minor	6	Minor	3
Elective	4	Elective[2]	5
	16		17

130 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Electives must be approved by adviser.
[3]Select 11 semester hours in the same language.
[4]To be selected from 300- and 400-level mathematical sciences courses with approval of adviser.

PHYSICS

For a major concentration a recommended program of study is shown below, with 129 semester hours required for graduation.

The BA in Physics program is ideal for students interested in acquiring a broad-based liberal education that includes a strong and solid understanding of science.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
PHYS 101 Current Topics in Modern Physics	1 (0,2)	PHYS 122 Phys. with Cal. I	3 (3,0)
	15		17

SOPHOMORE YEAR

MTHSC 206 Calculus of Sev. Var.	4 (4,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
PHYS 221 Physics with Cal. II	3 (3,0)	PHYS 222 Physics with Cal. III	3 (3,0)
PHYS 223 Physics Lab. I	1 (0,3)	PHYS 224 Physics Lab. II	1 (0,3)
Literature Requirement[1]	3	Literature Requirement[1]	3
Modern Language	4 (3,1)	Modern Language	4 (3,1)
Elective	1		
	16		15

JUNIOR YEAR

E&CE (PHYS) 340 Electric and Mag. Fields I	2 (2,0)	E&CE (PHYS) 341 Electric and Mag. Fields II	2 (2,0)
PHYS 321 Mechanics I	3 (3,0)	PHYS 322 Mechanics II	3 (3,0)
Humanities	3	Humanities	3
Minor	3	Minor	3
Modern Language	3 (3,0)	Modern Language	3 (3,0)
Elective	3	Elective	3
	17		17

SENIOR YEAR

PHYS 455 Quantum Physics I	3 (3,0)	Minor	3
Minor	6	Physics (as approved)	4
Physics (as approved)	4	Social Science	3
Social Science	3	Elective	6
	16		16

129 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

Note: For a major or minor concentration in Physics, PHYS 221 and 222 will count

ZOOLOGY

The Bachelor of Arts in Zoology is ideal for students desiring a liberal education emphasizing an interdisciplinary approach to a thorough understanding of the life sciences. For a major concentration, a recommended program of study is shown below, with 131 semester hours required for graduation.

FRESHMAN YEAR

First Semester[2]		Second Semester	
BIOL 110 Prin. of Biology I	5 (4,3)	BIOL 111 Prin. of Biology II	5 (4,3)
CH 101 General Chemistry	4 (3,3)	CH 102 General Chemistry	4 (3,3)
ENGL 101 Composition	3 (3,0)	ENGL 102 Composition II	3 (3,0)
Foreign Language[3]	4-3	Foreign Language[3]	4-3
	16-15		16-15

SOPHOMORE YEAR

HIST 172 Western Civilization	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
MTHSC 106 Cal. of One Var. I[2]	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
ZOOL 201 Invertebrate Zoology[4]	4 (3,3)	or MTHSC 301 Statistical Theory and Methods I	3 (3,0)
Foreign Language[3]	3 (3,0)	ZOOL 202 Vertebrate Zoology[4]	4 (3,3)
Literature Requirement[1]	3	Foreign Language[3]	3 (3,0)
	17	Literature Requirement[1]	3
			16-17

JUNIOR YEAR

BIOCH 210 Elem. Biochemistry	4 (3,3)	Humanistic-Social Science Elective	6
Major[4]	4	Major[4]	4
Minor	6	Minor	6
Elective	3-4		16
	17-18		

SENIOR YEAR

Humanistic-Social Science Elective	6	Humanistic-Social Science Elective	6
Major[4]	4	Major[4]	4
Minor	3	Elective	6-8
Elective	3		16-18
	16		

131 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]MTHSC 105 is required if a score of 550 is not achieved on the Mathematics Achievement Test (Level II), but cannot be used to satisfy the requirements for graduation.
[3]Four semesters of the same language are required.
[4]ZOOL 201, 202 count toward the required 24 hours of the Zoology major. At least one course or combination of courses and its laboratory totaling 4 hours must be taken from each of the following groups: (a) ZOOL 411, 420, or 470, 471; (b) ZOOL 457 or 459; (c) ZOOL 340 and 341 or 350 or GEN 305 and 306.

BACHELOR OF SCIENCE CURRICULA

BIOCHEMISTRY

Biochemistry is the study of the molecular basis of life. In order to comprehend the current biochemical information and to make future contributions to our molecular understanding of life processes, the student must obtain a broad background in biology and a firm foundation in chemistry, mathematics, and physics; the biochemistry curriculum is built upon this concept.

The program provides an excellent educational background for professional school (e.g., medicine, dentistry, or veterinary medicine) and graduate school in biochemistry or another biological science discipline.

Note: No curriculum in the College of Sciences leading to the Bachelor of Science degree will allow credit for ENGL 100, MTHSC 104 or 105 to be used to satisfy the requirements for graduation.

The graduate will find employment opportunities in the research and service programs of universities, medical schools, hospitals, research institutes, and industrial and government laboratories.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Prin. of Biology I	5 (4,3)	BIOL 111 Prin. of Biology II	5 (4,3)
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
	16		16

SOPHOMORE YEAR

CH 223 Organic Chemistry	3 (3,0)	BIOCH 304 Molecular Biology	3 (3,0)
CH 227 Organic Chemistry Lab.	1 (0,3)	CH 224 Organic Chemistry	3 (3,0)
MICRO 305 General Microbiology	4 (3,3)	CH 228 Organic Chemistry Lab.	1 (0,3)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	PHYS 221 Phys. with Cal. II	3 (3,0)
PHYS 122 Phys. with Cal. I	3 (3,0)	PHYS 223 Physics Lab. I	1 (0,3)
Literature Requirement[1]	3	Literature Requirement[1]	3
	18	Elective	3
			17

JUNIOR YEAR

BIOCH 422 Phys. Approach to Bioch.	3 (3,0)	BIOCH 424 Prin. of Biochemistry	3 (3,0)
BIOCH 425 Gen. Biochemistry Lab	1 (0,3)	BIOCH 426 Gen. Biochemistry Lab.	1 (0,3)
CH 331 Physical Chemistry	3 (3,0)	CH 332 Physical Chemistry	3 (3,0)
CH 339 Physical Chemistry Lab.	1 (0,3)	CH 340 Physical Chemistry Lab.	1 (0,3)
PHYS 222 Phys. with Cal. III	3 (3,0)	Science Requirement[3]	3
Science Requirement[3]	3	Elective	6
Elective	3		17
	17		

SENIOR YEAR

BIOCH 491 Special Problems in Bioch.	3 (0,9)	BIOCH 491 Special Problems in Bioch.	3 (0,9)
or Science Requirement[3]	3	or Science Requirement[3]	3
CH 313 Quantitative Analysis	3 (3,0)	Approved Elective[2]	13
CH 317 Quantitative Anal. Lab.	1 (0,3)		16
ENGL 301 Public Speaking	3 (3,0)		
Approved Elective[2]	7		
	17		

134 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]At least 18 hours must be elected from the humanities and/or social sciences. A one-year sequence from the following is strongly recommended: GER 101, 102; FR 101, 102; RUSS 101, 102.
[3]Requirement to be selected from botany, chemistry, computer science, genetics, mathematical sciences, microbiology, physics, plant pathology, or zoology. At least one semester of BIOCH 491 is required.

BOTANY

Botany is a diversified subject area that seeks to explain the many aspects of plant life—as it is today, as it was yesterday, and as it will be tomorrow. Areas explored by botanists range from highly theoretical experimentation to direct utilization of knowledge in order to solve problems such as the enhancement of food supplies, maintainance and improvement of human health, and conservation of nature's beauty. Studies in botany extend from consideration of minute molecular and subcellular activities to descriptions of structure, function, and action of

whole plants and to evaluations of how plants are associated with the operation of the entire planet.

The Bachelor of Sciences program is designed to prepare the student to undertake graduate study in botany or related fields by providing broad coverage of botanical disciplines while stressing experience in the physical and mathematical sciences.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Prin. of Biology I	5 (4,3)	BIOL 111 Prin. of Biology II	5 (4,3)
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
Elective	1	Elective	1
	17		17

SOPHOMORE YEAR

BOT 201 Field Botany	4 (2,4)	BOT 202 Survey of Plant Kingdom	4 (3,3)
CH 223 Organic Chemistry	3 (3,0)	CH 224 Organic Chemistry	3 (3,0)
CH 227 Organic Chemistry Lab.	1 (0,3)	CPSC 110 Elem. Computer Prog.	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	Literature Requirement[1]	3
ZOOL 201 Invertebrate Zoology	4 (3,3)	Approved Elective[2]	3
or ZOOL 202 Vertebrate Zoology	4 (3,3)		16
Literature Requirement[1]	3		
	18		

JUNIOR YEAR

BIOCH 301 General Biochemistry	3 (3,0)	BOT 421 Plant Physiology	4 (3,3)
BIOCH 302 Molecular Biology Lab.	1 (0,3)	GEN 305 Intro. and Mol. Genetics	3 (3,0)
BOT 431 Intro. Plant Taxonomy	4 (3,3)	GEN 306 Intro. and Mol. Genetics Lab.	1 (0,3)
PHYS 207 General Physics I	4 (3,2)	PHYS 208 General Physics II	4 (3,2)
Approved Elective[2]	6	Botany Elective[3]	2-3
	18	Elective	3
			17-18

SENIOR YEAR

BOT 411 Intro. Mycology	4 (3,3)	BOT 413 Phycology	4 (3,3)
BOT 441 Plant Ecology	4 (3,3)	BOT 435 Evol. of Plant Species	3 (3,0)
BOT 451 Plant Anatomy	4 (3,3)	BOT 455 Vasc. Plant Morphology	4 (3,3)
Science Elective[4]	6	Elective	5
	18		16

137-138 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]At least nine hours must be selected from the humanities and/or social sciences.
[3]Any 400-level botany course not otherwise required. BOT 491 must have prior approval of both instructor and adviser.
[4]At least two courses from the following: agronomy, astronomy, biochemistry, chemistry, entomology, forestry, genetics, geology, horticulture, microbiology, plant pathology, physics, zoology.

CHEMISTRY

Chemistry, an experimental discipline based on observation guided by molecular theory, is of fundamental importance in much of modern science and technology. Its molecular concepts form the basis for ideas about complex material behavior. Due to the fundamental nature and extensive application of chemistry, an unusually large variety of challenging opportunities to contribute in the science-oriented community

are open to the student whose education is built around the principles of this discipline.

The curriculum, through the career requirement options and the large number of electives, provides each student an opportunity to select a coherent program of study beyond the basic courses suited to his or her needs. Career requirement options are provided for students anticipating graduate study in chemistry or related fields; employment following the BS degree in laboratory, production, technical sales or management positions; professional studies (e.g., medicine); chemical physics; geochemistry; and employment in fields requiring extensive preparation in courses other than sciences (e.g., patent law and technical writing). Significant features of the curriculum are the student's extensive participation in experimental work and the opportunity to take part in a research investigation during the junior and senior years.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
GER 101 Elementary German[2]	4 (3,1)	GER 102 Elementary German[2]	4 (3,1)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
	15	PHYS 122 Phys. with Cal. I	3 (3,0)
			18

SOPHOMORE YEAR

CH 223 Organic Chemistry	3 (3,0)	CH 224 Organic Chemistry	3 (3,0)
CH 225 Organic Chemistry Lab.	2 (0,6)	CH 226 Organic Chemistry Lab.	2 (0,6)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	PHYS 222 Phys. with Cal. III	3 (3,0)
PHYS 223 Physics Lab. I	1 (0,3)	PHYS 224 Physics Lab. II	1 (0,3)
Literature Requirement[1]	3	Literature Requirement[1]	3
	16		16

JUNIOR YEAR

CH 313 Quantitative Analysis	3 (3,0)	CH 332 Physical Chemistry	3 (3,0)
CH 315 Quantitative Anal. Lab.	2 (0,6)	CH 340 Physical Chemistry Lab.	1 (0,3)
CH 331 Physical Chemistry	3 (3,0)	CH 411 Instrumental Analysis	4 (2,6)
CH 339 Physical Chemistry Lab.	1 (0,3)	Elective[3]	9
CPSC 110 Elem. Comp. Prog.	3 (3,0)		17
Elective[3]	4		
	16		

SENIOR YEAR

CH 402 Inorganic Chemistry	3 (3,0)	Career Requirement[4]	4
Career Requirement[4]	6	Elective	12
Elective[3]	7		16
	16		

130 Total Semester Hours

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[1] To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2] Students planning to take biology courses register for BIOL 110 and 111 in the freshman year and delay GER 101, 102, until the junior year.

[3] At least six hours must be in humanities and/or social sciences.

[4] A minimum of ten hours to be selected from advanced science, engineering, and mathematical sciences courses. (See adviser.)

COMPUTER SCIENCE

Computer Science is a discipline that is concerned with the design and use of computer systems and computer programs for the efficient processing of information. The Bachelor of Science program in Computer Science is oriented toward the design, implementation, and application of computer software systems in the solution of information processing problems. Students in computer science study the development of computer programs; the use of computers in storing, retrieving, and processing information; the functional aspects of computer hardware systems; and fundamental theoretical foundations of computer science.

The curriculum is designed to provide a broad education in computer science that prepares a student for a job in the computer field or for advanced study in computer science. Significant features of the curriculum are an applications emphasis that provides training in an applications area outside computer science and a large number of free electives. These features provide the opportunity for a student and adviser to design a plan of study that is tailored to individual needs.

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 110 Elem. Comp. Prog.	3 (3,0)	CPSC 130 Data Proc. with Cobol	3 (3,0)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
Humanities/Social Science[2]	3	Humanities/Social Science[2]	3
Natural Science[3]	4	Natural Science[3]	4
	17		17

SOPHOMORE YEAR

CPSC 210 Programming Methodology	3 (3,0)	CPSC 230 Assembly Lang. Prog.	3 (3,0)
MTHSC 219 Intro. to Discrete Meth.	3 (3,0)	CPSC 340 Intro. to Data Struc.	3 (3,0)
Commerce Requirement[4]	3	MTHSC 311 Linear Algebra	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Natural Science[3]	4	Natural Science[3]	3
	16	Elective	1
			16

JUNIOR YEAR

CPSC 330 Computer Systems Org.	3 (3,0)	CPSC 422 Systems Programming	3 (3,0)
CPSC 360 Perip. and File Design	3 (3,0)	ENGL 304 Business Writing	3 (3,0)
ENGL 301 Public Speaking	3 (3,0)	or ENGL 314 Technical Writing	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	Applications Emphasis[5]	3
Applications Emphasis[5]	3	Computer Science Requirement[6]	3
Elective	1	Decision Science Requirement[7]	3
	16	Elective	1
			16

SENIOR YEAR

CPSC 428 Design and Impl. of Prog. Languages	3 (3,0)	Applications Emphasis[5]	3
Applications Emphasis[5]	3	Computer Science Requirement[6]	3
Commerce Requirement[4]	3	Elective	10
Computer Science Requirement[6]	3		16
Elective	4		
	16		

130 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Select from the departmental list of approved humanities/social science courses.
[3]Must include one of the following sequences: BIOL 103, 104; 105, 106; CH 101, 102 or 112; PHYS 122, 221, 223.
[4]Select from ACCT 203, ECON 211, LAW 312, MGT 301.
[5]An application emphasis consists of 12 hours of related courses in an applications area as specified by the department.
[6]Must be approved and include two of the following: CPSC 423, 429, 462.
[7]Select from MTHSC 402, 405, 452.
Notes:
1. For graduation, a candidate for the BS degree in Computer Science will be required to have a 2.0 or higher cumulative grade-point ratio in the following 36 hours of courses: (a) all required courses taught by the Computer Science Department, and (b) the three approved computer science requirements. The candidate must also have earned a grade of C or better in each course of category (a) above.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next computer science course.

GEOLOGY

Geology is a relatively young science. The word itself is only about 200 years old. It means the science of the earth. Such a science must be involved with the physics and chemistry of materials which comprise the earth, but equally important it must consider the development of life on earth. Fundamentally, the chemical, physical and biological responses to various environments on and in the earth must be thoroughly understood so that the historical development of the earth may be deduced, predictions of the future inferred, and natural resources intelligently developed.

Industry in our modern civilization is dependent on minerals and rocks. Metals have their origin in them as do our chief power sources: coal, petroleum, and radioactive minerals. The power and wealth of nations depend largely on their exploration, control and development of mineral wealth.

Geologists today are entering upon a new era. Widening horizons are indicated by employment not only in mineral-producing industries but by railroads, municipalities, engineering firms, and water authorities. For this reason, it is important that the geologist's education rest on a broad yet rigorous base.

This curriculum provides the student with the fundamentals in the geological sciences and excellent support in the other basic sciences. On successful completion of the Bachelor of Science program the student should be adequately prepared for employment or for graduate study in any field of geology.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 102 or 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
Modern Language[2]	4 (3,1)	Modern Language[2]	4 (3,1)
	15		15

SOPHOMORE YEAR

GEOL 101 Physical Geology	4 (3,2)	GEOL 102 Historical Geology	4 (3,3)
HIST 172 Western Civilization	3 (3,0)	HIST 173 Western Civilization	3 (3,0)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	PHYS 122 Phys. with Cal. I	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Modern Language[2]	3 (3,0)	Modern Language[2]	3 (3,0)
	17		16

JUNIOR YEAR

BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
GEOL 306 Mineralogy	3 (2,3)	EXST 301 Introductory Statistics	3 (2,2)
PHYS 221 Phys. with Cal. II	3 (3,0)	GEOL 309 Petrology	3 (2,3)
PHYS 223 Physics Lab. I	1 (0,3)	GEOL 313 Stratigraphy and Sed.	3 (3,0)
Elective[3]	4	PHYS 222 Phys. with Cal. III	3 (3,0)
	15	PHYS 224 Physics Lab. II	1 (0,3)
			17

Summer Geology Field Course[4] 6

SENIOR YEAR

GEOL 402 Structural Geology	3 (2,2)	GEOL 310 Optical Mineralogy	3 (1,5)
GEOL 403 Invert. Paleontology	3 (2,3)	GEOL 404 Economic Geology	3 (3,0)
Elective[3]	11	Elective	10
	17		16

134 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]German or French is recommended. Two years in the same language are required.
[3]At least 12 hours must be elected from the humanities and/or social sciences.
[4]Clemson University does not conduct a field course in geology, but attendance at a course approved by the geology staff is required.

MATHEMATICAL SCIENCES

The Mathematical Sciences curriculum, carefully designed to possess a high degree of versatility, equips the student with the knowledge of mathematical concepts and methods that are applicable in the areas of physics, computer science, communication theory, data processing, statistics, operations research, economics, or any branch of the physical sciences in which a strong mathematical background is desired. In addition to containing the basic courses which provide the student with the mathematical skills necessary in the use of mathematics as it relates to other fields of knowledge, the curriculum allows the student in his junior year to select one of ten optional sets of courses, providing an introduction to an area where mathematics is applied. These options are Actuarial Science, Applied Mathematical Sciences, Biology, Chemistry, Computer Science, Managerial Science, Operations Research, Physics, Psychology, and Statistics.

In addition to the overall goal of preparing the student to cope with the dynamics of any mathematical environment, the curriculum seeks to provide an adequate background for the student who plans to pursue graduate study in mathematics or to fill many interesting positions in space research, computer development, business, or government research. Those electing the Biology option will have the necessary preparation for entering medical school.

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 110 Elem. Comp. Prog.	3 (3,0)	ECON 211 Prin. of Economics	3 (3,0)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
MTHSC 150 Intro. to Math. Sci.	1 (1,0)	Foreign Language[2]	4 (3,1)
Foreign Language[2]	4 (3,1)	Elective[3]	3
	15		17

SOPHOMORE YEAR

HIST 172 or 173 Western Civ.	3 (3,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	MTHSC 311 Linear Algebra	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	PHYS 122 Phys. with Cal. I	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Science[4]	4	Science[4]	4
	17		17

JUNIOR YEAR

MTHSC 360 Inter. Math. Computing	3 (3,0)	MTHSC 350 Intro. to Math. Models	3 (3,0)
MTHSC 453 Advanced Calculus I	3 (3,0)	MTHSC 454 Advanced Calculus II	3 (3,0)
or MTHSC 463 Math. Analysis I	3 (3,0)	or MTHSC 464 Math. Analysis II	3 (3,0)
Option	3	Option	3
Science[4]	4-3	Science[4]	4-3
Elective[3]	3-4	Elective[3]	3-4
	16		16

SENIOR YEAR

ENGL 301 Public Speaking	3 (3,0)	Mathematical Science Elective[5]	3
MTHSC 402 Theory of Probability	3 (3,0)	Option	3
MTHSC 412 Intro. to Mod. Algebra	3 (3,0)	Elective	10
or MTHSC 419 Discrete Math. Structures I	3 (3,0)		16
Option	3		
Elective[3]	4		
	16		

130 Total Semester Hours

OPTIONS

Chemistry		Statistics	
CH 331 Physical Chemistry	3 (3,0)	MTHSC 404 Intro. to Stoch. Proc.	3 (3,0)
CH 332 Physical Chemistry	3 (3,0)	MTHSC 405 Statistical Theory and Methods II	3 (3,0)
CH 339 Physical Chemistry Lab.	1 (0,3)	MTHSC 409 Statistical Theory and Methods III	3 (3,0)
CH 340 Physical Chemistry Lab.	1 (0,3)	MTHSC 471 Applied Statistical Decision Theory	3 (3,0)
CH 402 Inorganic Chemistry	3 (3,0)		
CH 435 Spectroscopy and Mol. Struc.	3 (3,0)		
	14		12

Applied Mathematical Sciences

Applications Area	3
Three of the following courses:	
MTHSC 425 Orthogonal Functions and Boundary Value Problems	3 (3,0)
MTHSC 434 Adv. Engr. Math.	3 (3,0)
MTHSC 435 Complex Variables	3 (3,0)
MTHSC 460 Intro. to Num. Anal. I	3 (3,0)
	12

Managerial Science[6]

ECON (MGT) 409 Managerial Economics	3 (3,0)
MGT 402 Prod. and Operations Mgt. I	3 (3,0)
MGT 418 Mgt. Inform. Sys.	3 (3,0)
MTHSC 404 Intro. to Stoch. Proc.	3 (3,0)
MTHSC 452 Linear Programming	3 (3,0)
	15

Actuarial Science[6]

MTHSC 231 Math. of Life Ins.	3 (3,0)
MTHSC 232 Actuarial Sci. Seminar I	1 (1,0)
MTHSC 404 Intro. to Stoch. Proc.	3 (3,0)
MTHSC 430 Actuarial Finite Diff.	3 (3,0)
MTHSC 432 Actuarial Sci. Seminar II	1 (1,0)
MTHSC 452 Linear Programming	3 (3,0)
	14

Operations Research

MGT 402 Prod. and Operations Mgt. I	3 (3,0)
MTHSC 404 Intro. to Stoch. Proc.	3 (3,0)
MTHSC 409 Stat. Theory and Meth. III	3 (3,0)
or MTHSC 461 Intro. to Num. Anal. II	3 (3,0)
MTHSC 452 Linear Programming	3 (3,0)
MTHSC 460 Intro. to Num. Anal. I	3 (3,0)
	15

Psychology[8]

PSYCH 201 Intro. to Psychology	3 (3,0)
PSYCH 210 Intro. Exper. Psych.	3 (3,0)
PSYCH 310 Adv. Exp. Psych.	4 (3,3)
PSYCH 391 Applied Psychology	3 (3,0)
PSYCH 471 Psychological Testing	3 (3,0)
	16

Physics[7]

E&CE (PHYS) 340 Electric and Magnetic Fields I	2 (2,0)
PHYS 321 Mechanics I	3 (3,0)
PHYS 322 Mechanics II	3 (3,0)
or PHYS 441 Elec. and Mag. II	3 (3,0)
	11

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Eight semester hours in the same language are required.
[3]These electives must be approved by the adviser.
[4]Must include two of the following sequences: BIOL 103, 104, 105, 106; CH 101, 102, or 112; ECON 314, ECON (MASC) 311; PHYS 221, 222, 223, 224.
[5]To be selected from MTHSC 403, 404, 405.
[6]Select the following sequence: ECON 314, ECON (MASC) 311.
[7]Select the following sequence: PHYS 221, 222, 223, 224.
[8]Select the following sequence: BIOL 103, 104, 105, 106.

MATHEMATICAL SCIENCES—BIOLOGY OPTION

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Principles of Biology I[2]	5 (4,3)	BIOL 111 Principles of Biology II[2]	5 (4,3)
CPSC 110 Elem. Comp. Prog.	3 (3,0)	ECON 211 Prin. of Economics	3 (3,0)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
MTHSC 150 Intro. to Math. Sci.	1 (1,0)		15
	16		

SOPHOMORE YEAR

CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	MTHSC 311 Linear Algebra	3 (3,0)
PHYS 207 General Physics I	4 (3,2)	PHYS 208 General Physics II	4 (3,2)
Literature Requirement[1]	3	Literature Requirement[1]	3
	18		18

JUNIOR YEAR

CH 223 Organic Chemistry	3 (3,0)	CH 224 Organic Chemistry	3 (3,0)
CH 227 Organic Chemistry Lab.	1 (0,3)	CH 228 Organic Chemistry Lab.	1 (0,3)
MTHSC 360 Inter. Math. Comp.	3 (3,0)	MTHSC 350 Intro. to Math. Models	3 (3,0)
MTHSC 453 Advanced Calculus I	3 (3,0)	MTHSC 454 Advanced Calculus II	3 (3,0)
or MTHSC 463 Math. Analysis I	3 (3,0)	or MTHSC 464 Math. Analysis II	3 (3,0)
Foreign Language[5]	4 (3,1)	Foreign Language[5]	4 (3,1)
Elective	2	Elective	2
	16		16

SENIOR YEAR

BOT 202 Survey of Plant King	4 (3,3)	ENGL 301 Public Speaking	3 (3,0)
or ZOOL 202 Vert. Zoology	4 (3,3)	HIST 172 or 173 Western Civ.	3 (3,0)
MTHSC 402 Theory of Probability	3 (3,0)	Biological Science Elective[6]	4-3
MTHSC 412 Intro. to Mod. Algebra	3 (3,0)	Mathematical Sciences Elective[4]	3
or MTHSC 419 Discrete Math. Structures I	3 (3,0)	Elective[3]	2-3
Elective	6		15
	16		

130 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]Those qualifying for advance placement in languages or wanting to take languages the freshman year may take them in place of these courses.
[3]Electives must be approved by adviser.
[4]To be selected from MTHSC 403, 404, or 405.
[5]In the same language.
[6]To be selected from BIOCH 301, BOT 441, GEN 302, MICRO 305, or any 300- and 400-level zoology course.

MATHEMATICAL SCIENCES—COMPUTER SCIENCE OPTION

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 110 Elem. Comp. Prog.	3 (3,0)	CPSC 210 Prog. Methodology	3 (3,0)
ENGL 101 Composition I	3 (3,0)	ECON 211 Principles of Economics	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 150 Intro. to Math. Sci.	1 (1,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
Foreign Language[2]	4 (3,1)	Foreign Language[2]	4 (3,1)
	15		17

SOPHOMORE YEAR

CPSC 230 Assembly Lang. Prog.	3 (3,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	MTHSC 311 Linear Algebra	3 (3,0)
MTHSC 301 Stat. Theory and Meth. I	3 (3,0)	MTHSC 360 Inter. Math. Comp.	3 (3,0)
Literature Requirement[1]	3	Literature Requirement[1]	3
Science[4]	4	Science[4]	4
	17		17

JUNIOR YEAR

MTHSC 350 Intro. to Math. Models	3 (3,0)	ENGL 301 Public Speaking	3 (3,0)
MTHSC 460 Intro. to Num. Anal. I	3 (3,0)	MTHSC 402 Theory of Probability	3 (3,0)
PHYS 122 Phys. with Cal. I	3 (3,0)	MTHSC 412 Intro. to Mod. Algebra	3 (3,0)
Science[4]	4-3	or MTHSC 419 Discrete Math. Structures I	3 (3,0)
Elective[3]	3-4	Science[4]	4-3
	16	Elective[3]	3-4
			16

SENIOR YEAR

HIST 172 or 173 Western Civ.	3 (3,0)	MTHSC 454 Advanced Calculus II	3 (3,0)
MTHSC 453 Advanced Calculus I	3 (3,0)	or MTHSC 464 Math. Analysis II	3 (3,0)
or MTHSC 463 Math. Analysis I	3 (3,0)	Computer Science Elective[5]	3
Computer Science Elective[5]	3	Elective	10
Mathematical Sciences Elective[6]	3		16
Elective[3]	4		
	16		

130 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]A two-semester sequence in the same language.
[3]These electives must be approved by adviser.
[4]Must include two of the following sequences: BIOL 103, 104, 105, 106; CH 101, 102 or 112; PHYS 221, 222, 223, 224; ECON 314, ECON (MASC) 311.
[5]Select from 300- and 400-level computer science courses or mathematical sciences computing courses.
[6]To be selected from the following: MTHSC 403, 404, 405, 452.

MEDICAL TECHNOLOGY

Medical technology is the area of health care in which analyses are performed on human body fluids in order to detect disease conditions. The medical technologist in a modern hospital laboratory must know how to perform and evaluate tests made in several broad disciplines, which include clinical chemistry, clinical microbiology, immunohematology, hematology, and blood bank. In order to perform in such diversified areas medical technologists are required to have a broad education in the basic sciences and rigorous training in clinical laboratory science. Medical technologists must know both the principles of test procedures and equipment, as well as the significance of the results of these tests in a diagnosis and treatment of disease. Medical technologists find employment in hospital clinical laboratories and in private, state, and federal health laboratories.

The program in Medical Technology at Clemson University consists of three years of lectures and laboratories on the Clemson campus and one year of clinical experience at an accredited school of medical technology. The courses required in the first three years of the program must be completed before the student can begin the clinical (fourth) year. The student must be in good standing at the University and have a grade-point ratio of 2.0 or above before entering a school of medical technology. Admission to these schools is by competition. Each school selects the students who will come to their school. This selection is made on the basis of published admission criteria which include grade-point ratio, grades in science courses, letters of reference, and interviews. Clemson University is affiliated with Anderson Memorial Hospital, Greenville Memorial Hospital, and Self Memorial Hospital. Applications to these schools should be made during the second semester of the sophomore year.

Upon satisfactory completion of the requirements of the curriculum, the student will receive the Bachelor of Science degree in Medical Technology from Clemson University. In addition to the degree, satisfactory performance on a certification exam is required by most employers.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Principles of Biology I	5 (4,3)	BIOL 111 Principles of Biology II	5 (4,3)
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MT 101 Intro. to Med. Tech.	1 (1,0)	Mathematical Sciences Requirement[2]	3-4
MTHSC 106 Cal. of One Var. I	4 (4,0)	Elective	3-2
	17		18

SOPHOMORE YEAR

CH 223 Organic Chemistry	3 (3,0)	BIOCH 301 General Biochemistry	3 (3,0)
CH 227 Organic Chemistry Lab.	1 (0,3)	CH 224 Organic Chemistry	3 (3,0)
HIST 172 Western Civilization	3 (3,0)	CH 228 Organic Chemistry Lab.	1 (0,3)
MICRO 305 General Microbiology	4 (3,3)	PHYS 208 General Physics II	4 (3,2)
PHYS 207 General Physics I	4 (3,2)	Literature Requirement[1]	3
Literature Requirement[1]	3	Elective	3
	18		17

JUNIOR YEAR

CH 313 Quantitative Analysis	3 (3,0)	GEN 305 Intro. and Molec. Gen.	3 (3,0)
CH 317 Quan. Anal. Lab.	1 (0,3)	GEN 306 Intro. and Molec. Gen. Lab.	1 (0,3)
MICRO 414 Basic Immunology	3 (2,3)	MICRO 411 Pathogenic Bacteriology	4 (3,3)
Humanities Requirement[3]	3	Humanities Requirement[3]	3
Elective	4	Option Requirement[4]	3
	14	Social Science Requirement[3]	3
			17

SENIOR YEAR

(52 Weeks)

MT 401 Immunology	3 (2,4)
MT 402 Clinical Microbiology	8 (4,11)
MT 403 Hematology and Hemostasis	5 (3,7)
MT 404 Blood Bank	4 (2,6)
MT 407 Urinalysis	2 (1,3)
MT 408 Clinical Chemistry	10 (6,14)
MT 491 Special Topics in Med. Tech.	3 (2,4)
	35

136 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2]To be selected from CPSC 110, EXST 301, MTHSC 108, 301.

[3]To be chosen from courses required to complete an alternate degree in Microbiology should the student not be accepted to a hospital school after completion of the academic requirement for the baccalaureate degree in Medical Technology.

[4]The option requirement is to be selected from the following: MICRO 400, 401, 412, 413, 415, 416, ZOOL 456, and other courses that will serve as background courses for medical technology.

Note: The manner in which each accredited clinical program implements the above curriculum may vary because of institutional differences.

MICROBIOLOGY

Microbiology deals with the study of bacteria, viruses, yeasts, filamentous fungi, protozoa, and unicellular algae. The microbiologist seeks to describe these organisms in terms of their structures, functions and processes of reproduction, growth and death, at both the cellular and molecular levels. He is also concerned with their ecology, particularly in regard to their pathological effects on man, and with their economic importance.

The Microbiology major provides a thorough training in the basic microbiological skills. Furthermore, the student receives instruction in mathematics, physics, chemistry, and biochemistry, all of which are essential to the training of a modern-day microbiologist. Through a wide choice of electives, the program allows a student to prepare for a variety of careers. The Microbiology curriculum with Molecular Biology option is recommended for students planning postgraduate programs. The microbiology graduate may enter graduate school in the fields of microbiology, biochemistry, bioengineering or related disciplines; he may enter a medical or dental school; or pursue a career in one of the many industries or public service departments dependent upon microbiology. Some of these are the fermentation and drug industries, medical and public health microbiology, various food industries, and agriculture.

Microbiology majors planning to apply for admission to a medical or dental school should inform their advisers immediately upon entering the Microbiology program.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Principles of Biology I	5 (4,3)	BIOL 111 Principles of Biology II	5 (4,3)
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MICRO 100 Microbes and Human Affairs	1 (1,0)
	16	Math. Sci. Requirement[2]	3-4
			16-17

SOPHOMORE YEAR

CH 223 Organic Chemistry	3 (3,0)	BIOCH 301 General Biochemistry	3 (3,0)
CH 227 Organic Chemistry Lab.	1 (0,3)	CH 224 Organic Chemistry	3 (3,0)
MICRO 305 General Microbiology	4 (3,3)	CH 228 Organic Chemistry Lab.	1 (0,3)
Literature Requirement[1]	3	Literature Requirement[1]	3
Math. Sci. or Sci. Elective[3]	3-4	Math. Sci. or Sci. Elective[3]	4-3
Social Science Elective	3	Microbiology Elective[4]	3
	17-18		17-16

JUNIOR YEAR

ENGL 301 Public Speaking	3 (3,0)	GEN 305 Intro. and Molec. Gen.	3 (3,0)
MICRO 401 Adv. Bacteriology	4 (2,6)	GEN 306 Intro. and Molec. Gen. Lab.	1 (0,3)
Physics Elective[5]	4-3	MICRO 412 Bacterial Physiology	4 (3,3)
Elective[4]	6-7	Physics Elective[5]	4
	17	Social Science Elective	3
		Elective[4]	3
			18

SENIOR YEAR

Social Science Elective	3	MICRO 411 Path. Bacteriology	4 (3,3)
Elective[4]	14-13	Elective[4]	12
	17-16		16

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]MTHSC 108 is required for the Microbiology-Molecular Biology option. Microbiology majors may select from CPSC 110, EXST 301, MTHSC 108, 301.
[3]To be selected from EXST 301, GEOL 101, MTHSC 108, or any course at the sophomore level or above offered by the College of Sciences, excluding microbiology.
[4]A minimum of 15 credits must be selected from the following courses: BOT 411, 413, MICRO 400, 403, 407, 410, 413, 414, 415, 416, 417, 491, PLPA 456, PS 458, ZOOL 403, 456.
[5]To be selected from the following course sequences: either PHYS 207, 208, or 122, 221, 223.
This curriculum provides a minimum of 22 open approved electives. Military science or aerospace studies may be elected if desired.

MICROBIOLOGY—MOLECULAR BIOLOGY OPTION

See Microbiology curriculum for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
CH 223 Organic Chemistry	3 (3,0)	BIOCH 301 General Biochemistry	3 (3,0)
CH 227 Organic Chemistry Lab.	1 (0,3)	CH 224 Organic Chemistry	3 (3,0)
MICRO 305 General Microbiology	4 (3,3)	CH 228 Organic Chemistry Lab.	1 (0,3)
Literature Requirement[1]	3	Literature Requirement[1]	3
Math. Sci. Requirement[3]	3	Microbiology Elective[2]	3
Social Science Elective	3	Social Science Elective	3
	17		16

JUNIOR YEAR

ENGL 301 Public Speaking	3 (3,0)	CH 313 Quantitative Analysis	3 (3,0)
MICRO 401 Adv. Bacteriology	4 (2,6)	or PHYS 417 Intro. to Biophys. I	3 (3,0)
MICRO 414 Basic Immunology	3 (2,3)	GEN 305 Intro. and Molec. Gen.	3 (3,0)
Physics Elective[4]	4-3	GEN 306 Intro. and Molec. Gen. Lab.	1 (0,3)
Elective[5]	3-4	MICRO 412 Bacterial Physiology	4 (3,3)
	17	Physics Elective[4]	4
		Elective[5]	3
			18

SENIOR YEAR

BIOCH 423 Prin. of Biochemistry	3 (3,0)	BIOCH 424 Prin. of Biochemistry	3 (3,0)
MICRO 415 Microbial Genetics	4 (3,3)	MICRO 411 Path. Bacteriology	4 (3,3)
MICRO 416 Introductory Virology	3 (3,0)	MICRO 491 Special Problems	2 (0,6)
Social Science Elective	3	Elective[5]	8
Elective[5]	3		17
	16		

134 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2]To be selected from the following courses: BOT 411, 413, MICRO 400, 403, 407, 410, 413, 417, PLPA 456, PS 458, ZOOL 403, 456.
[3]To be selected from CPSC 110, EXST 301, MTHSC 301.
[4]To be selected from the following course sequences: Either PHYS 207, 208 or 122, 221, 223.
[5]Should include one of the following courses: CH 313, 317, CPSC 110, EXST 301.
Note: Recommended electives in addition to those listed above are BIOCH 425, 426, BIOE 401, MTHSC 206, PHYS 473, ZOOL 459.
This option provides 17 semester hours of open approved electives. Military science or aerospace studies may be elected if desired.

PHYSICS

Physics is the most fundamental of the natural sciences, and it forms the basis upon which the study of other branches of science is founded. Physics is concerned with the fundamental behavior of matter and energy. Classical physics encompasses the fields of mechanics, heat and thermodynamics, electricity and magnetism, acoustics and optics. Modern physics is concerned with the study of atoms and molecules, atomic nuclei, elementary particles and the properties of liquids, crystalline solids, and other materials. It also includes the areas of relativity, cosmology, and the large-scale structure of the universe.

The undergraduate Physics curricula are designed to provide students with a strong background in the classical areas of physics as well as a basic introduction into the more important aspects of modern physics. The BS in Physics curriculum is directed toward preparing students for graduate study ultimately leading to the PhD degree or toward research and development work in industrial or governmental laboratories. It also provides a good background for graduate study or industrial work in many areas of engineering and applied science. Experimental modern physics is strongly emphasized.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
HIST 172 or 173 West. Civilization	3 (3,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	PHYS 122 Phys. with Cal. I	3 (3,0)
PHYS 101 Current Topics in Modern Physics	1 (0,2)	Elective	4
	15		18

SOPHOMORE YEAR

FR 101 Elementary French[2]	4 (3,1)	FR 102 Elementary French[2]	4 (3,1)
or GER 101 Elem. German[2]	4 (3,1)	or GER 102 Elem. German[2]	4 (3,1)
MTHSC 206 Calculus of Sev. Var.	4 (4,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	PHYS 222 Phys. with Cal. III	3 (3,0)
PHYS 223 Physics Lab. I	1 (0,3)	PHYS 224 Physics Lab. II	1 (0,3)
Literature Requirement[1]	3	Literature Requirement[1]	3
	15	Elective	3
			18

JUNIOR YEAR

E&CE (PHYS) 340 Elec. and Magnetic Fields I	2 (2,0)	E&CE (PHYS) 341 Elec. and Magnetic Fields I	2 (2,0)
MTHSC 425 Orthogonal Functions and Boundary Value Problems	3 (3,0)	PHYS 322 Mechanics II	3 (3,0)
PHYS 321 Mechanics I	3 (3,0)	PHYS 326 Exper. Physics II	4 (2,6)
PHYS 325 Exper. Physics I	4 (2,6)	Option	3
Option	3	Elective[3]	3
Elective	3		15
	18		

SENIOR YEAR

PHYS 455 Quantum Physics I	3 (3,0)	Physics (as approved)	3 (3,0)
PHYS 465 Therm. and Stat. Mech.	3 (3,0)	Option	3
Physics (as approved)	3	Elective[3]	9
Option	3		15
Elective[3]	3		
	15		

129 Total Semester Hours

OPTIONS

Electronics

E&CE 202 Electric Circuits I	3 (3,0)
E&CE 203 Electric Circuits Lab. I	1 (0,2)
E&CE 301 Electric Circuits II	2 (2,0)
E&CE 320 Electronics I	2 (2,0)
E&CE 325 Electronics Lab. I	1 (0,2)
E&CE 330 Elec. Sys. Anal.	3 (3,0)
	12

Chemical Physics

CH 331 Physical Chemistry	3 (3,0)
CH 332 Physical Chemistry	3 (3,0)
CH 402 Inorganic Chemistry	3 (3,0)
or PHYS 456 Quantum Physics II	3 (3,0)
CH 435 Spec. and Molec. Struc.	3 (3,0)
	12

Astrophysics

ASTR 301 General Astronomy	3 (3,0)
ASTR 302 General Astronomy	3 (3,0)
Astronomy (two 400-level courses)	6
	12

Geophysics

GEOL 101 Physical Geology	4 (3,2)
GEOL 306 Mineralogy	3 (2,3)
Any two:	
GEOL 309 Petrology	3 (2,3)
GEOL 402 Struc. Geology	3 (2,2)
PHYS 446 Solid State Physics	3 (3,0)
	13

Computer Science

CPSC 110 Elem. Comp. Prog.	3 (3,0)
CPSC 230 Assem. Lang. Prog.	3 (3,0)
CPSC 428 Design and Implementation of Prog. Lang.	3 (3,0)
or PHYS 446 Solid State Phys.	3 (3,0)
MTHSC 460 Intro. to Num. Anal. I	3 (3,0)
	12

Physics

PHYS 446 Solid State Physics	3 (3,0)
PHYS 456 Quantum Physics II	3 (3,0)
Math. Sci. (as approved)	6
	12

Mathematical Physics

MTHSC 434 Adv. Engr. Math.	3 (3,0)
MTHSC 435 Complex Variables	3 (3,0)
PHYS 456 Quantum Physics II	3 (3,0)
Math. Sci. (as approved)	3 (3,0)
	12

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[1] To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[2] RUSS 101, 102 may be substituted.
[3] A minimum of 12 hours of electives must be chosen from course offerings in the humanities and social sciences.

PHYSICS—BIOPHYSICS OPTION

The Biophysics option offers an excellent preparation for medical school or graduate work in biological science. It requires a total of 25 credits of approved electives in chemistry, biological science, physics, or mathematics.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4 (3,3)	CH 102 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
PHYS 101 Current Topics in Modern Physics	1 (0,2)	PHYS 122 Phys. with Cal. I	3 (3,0)
Biology Requirement	3	Biophysics Requirement	3
	15		17

SOPHOMORE YEAR

MTHSC 206 Calculus of Sev. Var.	4 (4,0)	MTHSC 208 Intro. to Ord. Diff. Equa.	4 (4,0)
PHYS 221 Phys. with Cal. II	3 (3,0)	PHYS 222 Phys. with Cal. III	3 (3,0)
PHYS 223 Physics Lab. I	1 (0,3)	PHYS 224 Physics Lab. II	1 (0,3)
Biophysics Requirement	4	Literature Requirement[1]	3
Literature Requirement[1]	3	Biophysics Requirement	4
	15	Elective[4]	3
			18

JUNIOR YEAR

E&CE (PHYS) 340 Electric and Mag. Fields I	2 (2,0)	E&CE (PHYS) 341 Electric and Mag. Fields II	2 (2,0)
FR 101 Elementary French[2]	4 (3,1)	FR 102 Elementary French[2]	4 (3,1)
or GER 101 Elem. German[2]	4 (3,1)	or GER 102 Elem. German[2]	4 (3,1)
PHYS 321 Mechanics I	3 (3,0)	HIST 172 Western Civilization	3 (3,0)
PHYS 325 Experimental Physics I	4 (2,6)	PHYS 322 Mechanics II	3 (3,0)
Biophysics Requirement	3	Biophysics Requirement	3
	16	Elective[4]	3
			18

SENIOR YEAR

PHYS 455 Quantum Physics I	3 (3,0)	Biophysics Requirement	4
PHYS 465 Thermodynamics and Statistical Mechanics[3]	3 (3,0)	Physics (as approved)	3 (3,0)
Biophysics Requirement	4	Elective	8
Elective[4]	6		15
	16		

130 Total Semester Hours

[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209
[2]RUSS 101, 102 may be substituted
[3]An approved physics course may be substituted for PHYS 465 if the student satisfactorily completes CH 331, 332.
[4]A minimum of 12 hours of electives must be chosen from course offerings in the humanities and social sciences.

PREPROFESSIONAL HEALTH STUDIES

The health professions, such as medicine and dentistry, need individuals with a diversity of educational backgrounds and a wide variety of talents and interests. The philosophies of education, the specific preprofessional course requirements, the noncognitive qualifications for enrollment, and the systems of training vary among the professional health schools, but all recognize the desirability of a broad education—a good foundation in the natural sciences (biology, chemistry, mathematics,

and physics), highly developed communication skills, and a solid background in the humanities and social sciences. The absolute requirements for admission to professional health schools are purposely limited to allow latitude for developing individualized undergraduate programs of study; however, all schools of medicine and dentistry require sixteen semester hours of chemistry, including organic chemistry, eight semester hours of biological sciences, eight semester hours of physics, and at least one course in calculus. These requirements in the natural sciences should be balanced with courses in vocabulary building, the humanities (literature, music, art, history, philosophy), and social sciences (economics, political science, psychology, sociology). The basic requirements in the natural sciences and as many as possible of the courses in the humanities and the social sciences should be completed by the third year of study so that the student will be prepared to take the Dental Admission Test or the Medical College Admission Test prior to making application to a professional school.

Undergraduates may prepare also to study optometry, podiatry, and other health professions. While the basic requirements for these professional schools are essentially the same as those for schools of medicine and dentistry, specific requirements for individual schools in these professions vary somewhat; consequently, the interested student is advised to consult with the Coordinator for Professional Health Studies.

At Clemson, rather than having a separate, organized preprofessional health study program, it is felt that an undergraduate student should be allowed to major in any curriculum, so long as the basic entrance requirements of the chosen professional health school are fulfilled. These schools are not so much concerned about a student's major as they are concerned that the student does well in whichever curriculum he chooses.

Professional health schools have neither preferences nor prejudices concerning any curriculum, which is evidenced by the fact that their entering students represent a broad spectrum of curricula. The emphasis is placed on the student doing well in the curriculum chosen, and this becomes critical as competition increases for the limited number of places available in professional health schools.

PREPHYSICAL THERAPY

Physical Therapy is a transfer, baccalaureate degree program at the Medical University of South Carolina. Students may acquire the prerequisites for the two-year professional training by following the suggested curriculum offered by Clemson University.

FIRST YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biol. Lab. I	1 (0,3)	BIOL 106 General Biol. Lab. II	1 (0,3)
CH 101 General Chemistry[1]	4 (3,3)	CH 102 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
PSYCH 201 Intro. to Psychology	3 (3,0)	Psychology Elective	3 (3,0)
Mathematical Sciences Elective[2]	3-5	Elective	3
	17-19		17

SECOND YEAR

PHYS 207 General Physics I[1]	4 (3,2)	PHYS 208 General Physics II	4 (3,2)
ZOOL 222 Human Anatomy	4 (3,3)	ZOOL 223 Human Physiology	4 (3,3)
Humanities Elective	3	Humanities Elective	6
Social Science Elective	3	Elective	3
Elective	3		17
	17		

68-70 Total Semester Hours

[1]Chemistry requires proficiency in algebra, and physics requires proficiency in trigonometry; therefore, entering freshmen must present a score of 550 or above on Level II of the Mathematics Achievement Test or register in the first semester for MTHSC 105.
[2]May be replaced by MTHSC 105 if necessary to satisfy the footnote above

PREPHARMACY

Prepharmacy is a five-year program, the first two years of which can be taken at Clemson. The student who follows the Prepharmacy curriculum will transfer, as a rule, to the College of Pharmacy at the Medical University of South Carolina or the College of Pharmacy at the University of South Carolina where the final three years will be completed. The degree in Pharmacy will be awarded by the institution attended. The following courses, including footnotes, satisfy entrance requirements for the Medical University of South Carolina or the University of South Carolina.

FIRST YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3 (3,0)	BIOL 104 General Biology II	3 (3,0)
BIOL 105 General Biology Lab. I	1 (0,3)	BIOL 106 General Biology Lab. II	1 (0,3)
CH 101 General Chemistry[2]	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
Required Elective[3]	3	MTHSC 106 Cal. of One Var. I	4 (4,0)
Elective	3	Required Elective[3]	0-3
	17		15-18

SECOND YEAR

CH 223 Organic Chemistry	3 (3,0)	CH 224 Organic Chemistry	3 (3,0)
CH 227 Organic Chemistry Lab.	1 (0,3)	CH 228 Organic Chemistry Lab.	1 (0,3)
PHYS 207 General Physics I[2]	4 (3,2)	PHYS 208 General Physics II	4 (3,2)
Literature Requirement[1]	3	Literature Requirement[1]	3
Required Elective[4]	4-6	Required Elective[4]	4-6
	15-17		15-17

62-69 Total Semester Hours

[1]To be selected from ENGL 202, 203, 204, 205, 206, 207, 208, 209
[2]Chemistry requires proficiency in algebra, and physics requires proficiency in trigonometry; therefore, entering freshmen must present a score of 550 or more on Level II of the Mathematics Achievement Test or register in the first semester for MTHSC 105.
[3]Six hours of history are required by the Medical University of South Carolina, ECON 200 or 211 is required by the University of South Carolina.
[4]Six hours of liberal arts or humanities credits are required each semester by the Medical University of South Carolina; ZOOL 222 and 223 are required by the University of South Carolina.

ZOOLOGY

Zoology is a broad area of scientific activity, including the study of all aspects of animal life from the structure and function of the whole organism down to the subcellular levels of organization, and up through the behavior and interactions of several organisms to the integrated existence of life on the entire planet. Descriptive, structural, functional, and evolutionary questions are investigated at all possible levels.

Majors in Zoology receive classroom, laboratory, and field training in classical and modern animal biology with an emphasis on chemistry, mathematics, statistics, and physics as necessary tools. The Zoology curriculum permits preparatory training for a variety of professional objectives including graduate school, the health professions (medicine, dentistry, etc.), veterinary medicine, biomedical engineering, biochemistry, biomathematics, and biophysics.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Prin. of Biology I	5 (4,3)	BIOL 111 Prin. of Biology II	5 (4,3)
CH 101 General Chemistry	4 (3,3)	CH 112 General Chemistry	4 (3,3)
ENGL 101 Composition I	3 (3,0)	ENGL 102 Composition II	3 (3,0)
MTHSC 106 Cal. of One Var. I	4 (4,0)	MTHSC 108 Cal. of One Var. II	4 (4,0)
	16		16

SOPHOMORE YEAR

CH 223 Organic Chemistry	3 (3,0)	BIOCH 301 General Biochemistry[3]	3 (3,0)
CH 227 Organic Chemistry Lab	1 (0,3)	BIOCH 302 Molecular Biol. Lab.[4]	1 (0,3)
ZOOL 201 Invertebrate Zoology	4 (3,3)	CH 224 Organic Chemistry	3 (3,0)
Literature Requirement[1]	3	ZOOL 202 Vertebrate Zoology	4 (3,3)
Elective[2]	7	Literature Requirement[1]	3
	18	Elective[2]	4
			18

JUNIOR YEAR

PHYS 207 General Physics I	4 (3,2)	PHYS 208 General Physics II	4 (3,2)
Major[5]	7	Major[5]	7
Elective[2]	6	Elective[2]	6
	17		17

SENIOR YEAR

Major[5]	7	ZOOL 493 Undergraduate Seminar	1 (1,0)
Elective[2]	10	Major[5]	7
	17	Elective[2]	8
			16

135 Total Semester Hours

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[1]To be selected from the following: ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2]Electives:

(a) A minimum of 6 elective hours must be chosen from course offerings in social sciences (geography, economics, history, political science, psychology, and sociology).

(b) A minimum of 6 elective hours must be chosen from course offerings in the humanities (foreign languages, humanities, literature, philosophy, and religion).

[3]BIOCH 423 may substitute for BIOCH 301 but should not be taken until the junior year.

[4]CH 228 or BIOCH 425 may substitute for BIOCH 302. BIOCH 425 should be taken in conjunction with BIOCH 423.

[5]A minimum of 28 hours must be chosen from courses offered in the Department of Zoology. These courses must be at the 300 level or higher. One course is to be taken from each of the following blocks:

(a) ZOOL 411, 420, or 470 and 471.

(b) ZOOL 457 or 459.

(c) GEN 305 and 306, ZOOL 340 and 341, or ZOOL 350.

DESCRIPTION OF COURSES

This list of courses includes for each course the catalog number, title of course, credit in semester hours, class laboratory hours per week, and the description of the course. In general, courses numbered 100-199 are freshman courses; 200-299, sophomore courses; 300-399, junior courses; and 400-499, senior courses. Courses numbered 600 and above are graduate courses and are open only to students admitted to the Graduate School, except that seniors with exceptional records may be enrolled with special permission. Where courses are offered on a schedule, there is a designation F, S or SS following the title of each course, indicating whether it is customarily offered in the fall, spring, or summer school.

ACCOUNTING (ACCT)

Professors: J. R. Davis, *Director;* J. G. Louderback, J. D. Sheriff, J. A. Turner, Jr., J. M. Wannamaker; *Associate Professors:* A. S. Boyett II, L. S. Clark, G. T. Friedlob, F. R. Gray, J. A. Kimbell, Jr., L. P. Ramsay, R. W. Rouse, A. D. Sessions; *Assistant Professors:* J. D. Acker, E. L. Bryan, L. S. Cash, L. E. Davis, V. D. R. Guide, F. J. Plewa, Jr.; *Lecturers:* N. E. Byerley, C. J. Ringeisen

101 (FIN) Accounting and Finance Orientation 1(1,0) A broad overview of the nature of accounting and finance and their role in the industrial, financial, and governmental environments. If taken for credit, this course must be completed before or concurrently with ACCT 200 or 201.

200 Basic Accounting 3(3,0) This course is designed as a general survey of accounting for the student requiring only a basic knowledge of principles and concepts. May not be taken by students in curricula requiring ACCT 201 or 203.

201, H201 Principles of Accounting 3(3,0) An introduction to the role of accounting, basic concepts and methodology, processing of business transactions, valuation and income determination principles, and financial statement preparation.

202, H202 Principles of Accounting 3(3,0) Continuation of ACCT 201, covering accounting for the corporate form of the business entity and elements of accounting for management planning, budgeting, and control. Emphasis is on management uses of accounting information. *Preq:* ACCT 201.

203 Financial Accounting 3(3,0) Emphasizes the principles and methods which influence the financial statements provided to external users. May not be taken by students in curricula requiring ACCT 200 or 201.

210 Federal Taxation for Non-Accountants 3(3,0) A survey of the taxation of individuals, corporations, partnerships, estates, gifts, and trusts for the general business and nonbusiness student. May not be taken for credit by Accounting majors.

301 Intermediate Accounting 3(3,0) An indepth treatment of the traditional financial accounting topics of current assets and liabilities, plant assets, long-term liabilities, and present values as well as recent developments in accounting valuation, reporting practices, environment of accounting, and basic theory underlying financial accounting. *Preq:* ACCT 202.

302 Intermediate Accounting 3(3,0) An indepth treatment of the traditional financial accounting topics of stockholders' equity, earnings per share, investments, revenue recognition, deferred income taxes, pension costs, leases, accounting changes and error analysis, statements of changes in

financial position, financial reporting and changing prices, ratio analysis, and disclosure. *Preq:* ACCT 301.

303 Cost Accounting 3(3,0) The application of cost analysis to manufacturing and distributing problems. Analysis of behavior characteristics of business costs and a study of principles involved in standard cost systems. Lectures and problems. *Preq:* ACCT 202.

307 Managerial Accounting 3(3,0) Emphasizes internal use of accounting data by the manager in establishing plans and objectives, controlling operations, and making decisions involved with management of an enterprise. Cannot be taken for credit by students receiving credit for ACCT 303. *Preq:* ACCT 202 or 203.

403 Selected Topics in Accounting 3(3,0) Course provides for indepth study and research into one or a few accounting topics chosen by the instructor. *Preq:* Consent of instructor.

404, 604 Individual Taxation 3(3,0) Interpretation of Federal income tax laws, regulations, and court decisions with practice in application of these laws to the returns of individuals, partnerships, and corporations. *Preq:* Junior standing.

405, 605 Corporate Taxation 3(3,0) Tax planning and research. Advanced phases of income taxation with emphasis on special problems applicable to corporations, partnerships, estates and trusts. *Preq:* Junior standing.

407 Accounting Research 1(1,0) A directed research course for those students interested in a career in accounting. *Preq:* ACCT 302.

410, 610 Budgeting and Executive Control 3(3,0) The study and application of selected techniques used in the planning and control functions of business organizations. *Preq:* ACCT 303 or 307.

411, 611 Advanced Accounting 3(3,0) A financial accounting course covering the conceptual and practical aspects of accounting for branches, business combinations, consolidations, partnerships, and foreign transactions and operations. *Preq:* ACCT 302.

415, 615 Auditing 3(3,0) Professional and practical auditing theory. Review of internal controls, audit procedures, and development of audit programs for various types of businesses; consideration of auditor's professional and ethical standards. *Preq:* ACCT 302.

416, 616 Auditing Practice and Procedure 3(3,0) Practical application of auditing theory through case studies and preparation of work papers in a simulated audit. Special emphasis on audit adjustments, sampling and testing techniques, internal control and flow charting. *Preq:* ACCT 415.

420 Certified Public Accountant Problems 3(3,0) Intensive practice in analyzing and solving certified public accountant-level accounting problems. Offered only on pass-fail basis for free elective credit. *Preq:* ACCT 411 or consent of instructor.

422 Accounting Information Systems 3(3,0) A study of computer-based accounting systems with attention to systems design, application, internal control, auditing the system, and system security. *Preq:* CPSC 120. *Coreq:* ACCT 302 or consent of instructor.

425 Contemporary Accounting Theory 3(3,0) Contemporary accounting theory emphasizes the major challenges and controversies within the field of accounting today. Attention is given to theoretical and conceptual issues underlying current financial reporting as well as pragmatic conventions. The evolution of accounting objectives and standards, as evidenced by the pronouncements of professional organizations, will receive special emphasis. *Preq.* ACCT 302.

430, 630 Governmental and Institutional Accounting 3(3,0) Accounting and reporting principles, standards, and procedures used by the Federal government, state and local governments, and other not-for-profit institutions are examined and discussed. Hospital and university accounting are reviewed. Unique aspects of the governmental auditing environment are analyzed. *Preq:* ACCT 302 or consent of instructor.

801 Contemporary Financial Accounting Theory 3(3,0)

802 Advanced Auditing 3(3,0)

303 Accounting Information Systems 3(3,0)

304 The Environment of Accounting 3(3,0)

805 Research Seminar in Accounting 1(1,0)

806 Advanced Accounting Problems 3(3,0)

815 Federal and State Income Taxation of Corporations 3(3,0)

816 Taxation of Estates, Gifts and Fiduciaries 3(3,0)

817 Tax Planning and Research 3(3,0)

821 Controllership 3(3,0)

822 Management Accounting in Textiles and Manufacturing 3(3,0)

823 Management Accounting in Financial Institutions 3(3,0)

830 Advanced Financial Management 3(3,0)

AEROSPACE STUDIES (AS)

Professor: L. E. Jordan, *Head; Assistant Professors:* M. A. Frazier, G. E. Miller, R. Sorrenti, R. H. Sutherland

109 Air Force Today I 1(1,1) This course deals with the Air Force in the contemporary world through a study of the total force structure: strategic offensive and defensive, general purpose, and aerospace support. Leadership laboratory activities include drill fundamentals, customs, and courtesies of the service.

110 Air Force Today II 1(1,1) Continuation of AS 109. Leadership laboratory includes drill, ceremonies, and an introduction of Air Force career opportunities.

209 Development of Air Power I 1(1,1) The course includes the study of the development of air power from balloons and dirigibles through the peaceful employment of U.S. air power in relief missions and civic action programs in the late 1970s and also the air war in Southeast Asia. Leadership laboratory provides experience in guiding, directing, and controlling an Air Force unit.

210 Development of Air Power II 1(1,1) Continuation of AS 209.

309 Air Force Leadership and Management I 3(3,1) Course emphasizing the indivdual as a manager. Individual motivational and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for the development of the Air Force officer's professional skills. Students will prepare individual and group presentations; write reports; participate in group discussions, seminars, and conferences.

310 Air Force Leadership and Management II 3(3,1) Continuation of AS 309, using the basic managerial processes involving decision-making, utilization of analytical aids in planning, organizing, and controlling environment. Actual case studies are used to enhance learning and communication processes.

409 National Security Policy I 3(3,1) Analysis of the role and function of the military officer in a democratic society and the relationships involved in civil-military interactions. Flight instruction and ground school for pilot candidates. Students will be expected to prepare individual and group presentations for the class, write reports, and participate in group discussions.

410 National Security Policy II 3(3,1) Continuation of AS 409, examining the environmental context in which U.S. defense policy is formulated and implemented. Emphasis placed on initial commissioned service and military justice. Students will be expected to prepare individual and group presentations for the class, write reports, and participate in group discussions, seminars, and conferences.

AGRICULTURAL ECONOMICS (AGEC)

Professors: L. L. Bauer, B. L. Dillman, J. E. Faris, M. S. Henry, J. C. Hite, B. H. Robinson, *Head;* J. W. Hubbard, J. S. Lytle, E. L. McLean, C. S. Thompson; *Associate Professors:* M. D. Hammig, J. W. Jordan, T. A. Lyson, S. E. Miller, R. J. Rathwell, G. J. Wells; *Assistant Professors:* E. H. Kaiser, J. C. O. Nyankori

202 Agricultural Economics 3(3,0)F, S An analytical survey of the various subdivisions of agricultural economics, to include farm organization, enterprise analysis, land economics, marketing, farm prices, governmental farm policies, and the relation of agriculture to the national and international economy.

302 Economics of Farm Management 3(2,3)F Economic principles underlying the organization and operation of agricultural firms and related business enterprises. Particular emphasis is directed to management aspects of the farm as a production unit. *Preq:* AGEC 202 or ECON 211.

308 Quantitative Agricultural Economics 3(3,0)F Basic quantitative relationships in agricultural economics are examined and interpreted using mathematics. Emphasis is placed on the use of deterministic models in agricultural production and marketing and in the examination of the interrelationships between the performance of the U.S. economy and the agricultural sector. *Preq:* AGEC 202 or ECON 211; EXST 301 or MTHSC 203; MTHSC 102 or 106.

309 Economics of Agricultural Marketing 3(3,0)F, S A general course in marketing agricultural commodities with particular emphasis upon food products. Efficiency criteria, consumer behavior, market organizations and institutions, and marketing functions are analyzed. *Preq:* AGEC 202.

319 Agribusiness Management 3(3,0)F A study of the principles used in making management decisions and the application of these principles in agribusiness. Emphasis is given to the application of economics to the solution of problems facing managers of agricultural supply and marketing firms. *Preq:* AGEC 302 or 309.

351 Advertising and Merchandising 3(3,0)F A general introduction to advertising and merchandising theories and some practice with basic techniques. A partial list of subjects covered includes function of advertising, propriety in advertising, institutions, media, market research, consumer appeals, loss leaders, mass displays, trademarks and brands, writing copy, color, layout, agencies and integrated advertising campaigns. *Preq:* Junior standing.

352 Public Finance 3(3,0)S Principles of financing government, sources of public revenue, objects of public expenditures, problems of fiscal administration, and the application of fiscal policies in stabilizing the national economy. *Preq:* Junior standing.

402, 602 Production Economics 3(3,0)F An economic analysis of agricultural production involving (a) the concept of the farm as a firm, (b) principles for decision making, (c) the quantitative nature and use of production and cost functions and their interrelations and application of these principles to resource allocation in farms and among areas. *Preq:* AGEC 308 and ECON 314.

403, 603 Land Economics 3(3,0)S A study of the characteristics of land and of the physical, legal, social and economic principles and problems relating to the control and use of land resources. Preq: AGEC 202 or ECON 200.

406 Seminar 1(1,0)S And examination of the relation of economics and sociology to specific problems. *Preq:* Senior standing.

409, 609 Commodity Futures Markets 3(3,0)F Introduction to the economic theory, organization, and operating principles of agricultural commodity futures markets in the U.S. Emphasis is placed on speculating, hedging, and investing in agricultural commodity futures contracts from the standpoint of the agribusiness entrepreneur. *Preq:* AGEC 202 or ECON 211.

411, 611 (CRD) Regional Impact Analysis 2(2,0) See CRD 411.

412, 612 (CRD) Spatial Competition and Rural Development 2(2,0) See CRD 412.

413, 613 Rural Property Appraisal 3(3,0)S A study of the principles and procedures of appraising rural properties. Attention will be focused on types of appraisal approaches and economic factors considered in appraising rural properties. *Preq:* ACCT 200 or 201, AGEC 202 or ECON 211.

452, H452, 652 Agricultural Policy 3(3,0)F A review of public agricultural policy programs in the United States and a critical examination of current and proposed government policies and programs affecting the agricultural sector of the economy. Included are economic considerations as related to past and current farm price and income problems. *Preq:* AGEC 302 and 309.

456, H456, 656 Prices 3(3,0)S A review of the basic theory of price under competitive conditions and various modifications; nature, measurement and causes of daily, seasonal and cyclical price fluctuations; geographical price relationships; nature, function and behavior of futures markets; government price programs. *Preq:* AGEC 308, ECON 314, EXST 462.

460, 660 Agricultural Finance 3(3,0)F The study of the principles and techniques of financing in the agricultural sector. Topics include the capital situation in agriculture, concepts of farm financial management, use of credit, capital markets, lending agencies, and estate planning. *Preq:* ACCT 200 or 201, AGEC 202.

491 (CRD) Internship, Agribusiness, and Community and Rural Development 1-6(0,2-12) See CRD 491.

719 Professional Problems in Agribusiness Management 3(3,0)

791 Selected Topics in Agricultural Economics 1-3(1-3,0)

802 Advanced Production Economics 3(3,0)

806 Input-Output Analysis and Regional Structure 2(2,0)

807 Market Structure in Agricultural Industries 3(3,0)

808 Applied Quantifications in Agricultural Economics 3(3,0)

809 Advanced Natural Resource Economics 3(3,0)

810 Water and Marine Resources Management and Policy 3(3,0)

812 Interregional Competition Analysis 2(2,0)

814 Contemporary Public Policy 3(3,0)

827 Advanced Agricultural Consumption and Demand 3(3,0)

851 Seminar in Research Methodology 1(1,0)

852 Research Methods for Agricultural Economists I 2(2,0)

853 Research Methods for Agricultural Economists II 2(2,0)

871 Workshop in Quantitative Methods in Agricultural Economics 1(1,0)

872 Techniques of Survey Analysis in Social Sciences 1(1,0)

881 Internship in Community and Resource Development 1-6

891 Master's Research. Credit to be arranged.

902 Production Economics Problems 2(2,0)

904 Seminar in Resource Economics 3(3,0)

906 Seminar in Area Economic Development 3(3,0)

907 Agricultural Marketing Problems 2(2,0)

991 Doctoral Research. Credit to be arranged.

AGRICULTURAL EDUCATION (AGED)

Professors: J. A. Hash, R. J. Mercer, J. H. Rodgers, *Head; Associate Professors:* L. H. Blanton, J. H. Daniels

100 Orientation and Field Experience 1(0,2) Supervised observations and explanations of vocational agriculture teaching while serving as teacher aides. One full week of field experience in representative high schools is required.

201 Introduction to Agricultural Education 3(2,3)F Principles of education, development of agricultural education, and an introduction to the formulation of instructional programs for the teaching of agricultural courses.

300 Supervised Field Experience I 1(0,3) Actual participation in vocational agriculture teaching activities plus conferences with local supervising teachers and college supervisors. One full week of field experiences in specialized high school programs or area vocational centers is required.

400 Supervised Field Experience II 1(0,3) Special emphasis is placed on filling gaps in existing knowledge and experiences of the students. The primary focus will be on becoming acquainted

with the student teaching center well in advance of the customary twelve-week directed teachin experience.

401, 601 Methods in Agricultural Education 3(2,3)S Appropriate methods of teaching vocationa agriculture in high schools. The course includes procedures for organizing teaching programs teaching high school students, and directing F.F.A. activities.

406 Directed Teaching 12(0,36) Guided participation in the professional responsibilities of a teacher of vocational agriculture including an intensive study of the problems encountered and the competencies developed. Twelve weeks of directed teaching in selected schools is required *Preq:* AGED 400, 401.

423, 623 Curriculum 2(2,0)F Curriculum goals and related planning for career and continuin education programs.

425, 625 Teaching Agricultural Mechanics 2(1,3)S Organizing course content, conducting and managing an agricultural mechanics laboratory, shop safety, microteaching demonstrations o psychomotor skills, and methods of teaching manipulative abilities.

428, 628 Special Studies in Agricultural Education 1-3(1-3,0) Students are provided with an oppor tunity to study individually or collectively selected topics and/or problems in agricultural educa tion to meet the particular needs of the clientele enrolled. May be taken twice or for a maximun of six semester hours credit.

430, 630 Fundamentals of Extension Education 2(2,0) Course is designed to introduce students t fundamental philosophy, activities, and methods undergirding the Cooperative Extension Service *Preq:* Consent of instructor.

431, 631 Methods in Environmental Education 3(3,0)SS A study of various techniques appropriat for teaching environmental education. Instruction is applicable to elementary, high school, and adult-level teachers. Offered in Summer School only.

432, 632 Visual Media for Agribusiness 3(2,3) A theoretical and practical course for professionals i agriculture with major emphasis on visual communications.

450, 650 Modern Topics and Issues 3(3,0) A major area of concern to teachers of agriculture and county agents will be selected for intensive study at least one semester prior to offering the course Team teaching with faculty from other departments in the College of Agricultural Sciences will b utilized when feasible. *Preq:* Senior standing or relevant experience.

465, 665 Program and Curriculum Development 3(3,0)F, Even-numbered years. Each student wil determine needs and resources in a specific community and plan a program and curriculum t meet these needs. Instruction is appropriate for agricultural, extension, and vocational personnel

467, 667 Adult Education in Agriculture 3(2,3)S, Odd-numbered years. Principles and practice appropriate to the solution of problems encountered in instructional programs for adult farmers

726 Agricultural Mechanization for Inservice Teachers 3(3,0)

727 Agricultural Education Shop Management 3(1,6)

736 Internship: Teaching 3(1,6)

737 Internship in Agribusiness Firms 3(1,6)

750 Special Institute Course: Selected Topics in Agricultural Education 1-3(1-3,0)

803 Evaluation of Instructional Programs 3(2,3)

804 Special Problems 3(2,3)

805 Administration and Supervision in Agricultural Education 3(3,0)

815 Teaching Agricultural and Power Mechanics 3(2,3)

820 Teaching Young Farmers 3(3,0)

825 Supervision of Student Teaching 3(3,0)

869 Seminar 1-3(1-3,0)

889 (INED) Research in Education 3(3,0)

AGRICULTURAL ENGINEERING (AGE)

Professors: J. M. Bunn, J. T. Craig, T. H. Garner, R. O. Hegg, C. E. Hood, Jr., J. T. Ligon, E. J. Middlebrooks, B. K. Webb, *Head;* R. E. Williamson, T. V. Wilson; *Associate Professors:* W. H. Allen, G. E. Miles; *Assistant Professors:* J. A. Collier, J. B. Davis, M. J. Delwiche, F. A. Payne; *Instructors:* R. B. Dodd, J. B. Lindsay; *Visiting Professor:* K. Ladenburg

181 Agricultural Engineering Concepts 1(0,3)S This course utilizes computers and basic engineering concepts to solve typical agricultural engineering problems. Tours, guest speakers, and films are used to acquaint the student with problems in engineering practice. The topics covered prepare the student to use the computer in subsequent courses. *Preq:* ENGR 180 or consent of instructor.

212 Fundamentals of Mechanization 3(2,3)S Functional analysis of selected agricultural equipment and the economic performance of machine systems; also, the utility and principles of applied technology and processes essential to providing a background for engineering design, research and development. *Preq:* EG 109.

221 Soil and Water Resources Engineering I 3(2,3)F Physical relationships of factors governing rainfall disposition are used as bases for defining the hydrology of agricultural watersheds. The surveying necessary for design and application of resource management measures and structures is taught. *Preq:* MTHSC 106.

353 Computational Systems 2(1,3) Digital and analog techniques are used to solve agricultural engineering problems, including simulation of biological systems. Hybrid and advanced digital computational methods are studied. *Preq:* ENGR 180, MTHSC 208.

355 Engineering Analysis and Creativity 2(1,3) The creative and analytical portions of the engineering design process are developed in a problem approach. Application of physical and mathematical principles, analytical and experimental modeling and intelligent assumption making are stressed. Students are also introduced to the techniques of systems analysis. *Preq:* MTHSC 208, PHYS 221.

362 Energy Conversion in Agricultural Systems 3(2,3)S The energy requirements of agricultural systems with emphasis upon energy conversion methods. Characteristics of various sources of energy will be considered including economic aspects. The present energy conversion mechanisms used in agriculture will be studied and their limitations considered. *Preq:* ME 311.

364 Agricultural Waste-Management Systems 2(2,0) The course will include planning and design of waste-management systems which employ physical, biological, and chemical processes for the treatment and utilizations of agricultural wastes. Solid, liquid, and gaseous wastes are considered. Presentation is relevant to current agricultural practices and legal and social restraints.

416, 616 Agricultural Machinery Design 3(2,3)S Engineering analysis of machines and basic agricultural operations and systems requiring machine functions. Fundamentals of machine design with applications to agricultural machinery. Velocity and acceleration, analyses, dimension determination, power transmission, and vibrations in machinery are studied. *Preq:* EM 304.

422, 622 Soil and Water Resources Engineering II 3(2,3)S Basic soil-water-plant relationships are used to establish criteria for the analysis and design of facilities and structures for conservation, water control, drainage and irrigation. Engineering relationships involved in the design of such facilities are emphasized. *Preq:* AGE 221, AGRON 202, EM 320, or consent of instructor.

431, 631 Agricultural Structures Design 3(2,3)F Analytic and synthetic design of building components, including fastening devices, as determined by both live and dead loads with emphasis on statically determinant members and their positions and utilizations in frames and trusses. Major materials considered are wood, steel, and concrete. *Preq:* EM 304.

433, 633 Design Criteria for Plant and Animal Environment 2(2,0) This course evaluates, develops, and interprets criteria for the environmental design of selected agricultural production facilities by studying environment as it relates to the physiology of plants and animals. Simulation of physiological systems will be emphasized. *Preq:* Course in animal science or plant science or consent of instructor.

442 Agricultural Process Engineering 3(2,3)S Design of unit operations components used in agricultural processing. Engineering principles and instrumentation as applied to control systems, heat transfer, materials handling, storage and related subjects are emphasized. *Preq:* E&CE 307, EM 320, ME 311.

450, 650 Agricultural Engineering Instrumentation 3(2,3) Overview of modern instrumentation techniques in agricultural engineering systems. Emphasis is on laboratory use of equipment. Topics include performance characteristics of instruments, analog signal conditioning, transducer theory and applications, and digital systems for data acquisition and control. *Preq:* E&CE 307, MTHSC 208, familiarity with computer programming, or consent of instructor.

465, 665 Engineering Properties of Biological Materials 2(1,3)S The thermal, electrical, mechanical, and chemical characteristics of biological materials, organisms, and metabolic processes are studied in relationship to engineering analysis and synthesis. The effects of environmental factors imposed by engineering processes are evaluated. *Preq:* AGE 353.

471 Research I 1(0,3) This course is designed to acquaint senior students in Agricultural Engineering with the scientific method through execution of an independent research project. Selection of a research topic, a thorough literature review, and detailed and analytical investigation will be required. *Preq:* Senior standing in Agricultural Engineering or other engineering curricula.

472 Research II 1(0,3) Continuation of AGE 471. Students will complete their research projects with experimental verification of the analytical model developed in previous course. A formal report and an oral presentation of results are required. An introduction to real-world engineering problems will be accomplished through guest lecturers. *Preq:* AGE 471.

473, H473 Special Topics in Agricultural Engineering 3(3,0) A comprehensive study of special topics in the field of agricultural engineering not covered in other courses. Special emphasis will be placed on independent pursuit of detailed investigations.

781 Special Problems 1-3

811 Tillage and Soil Dynamics 3(3,0)

822 Water Movement in Soils 3(3,0)

865 Heat and Moisture Transfer in Biological Materials 3(3,0)

871 Selected Topics in Agricultural Engineering 1-3

882 Systems Engineering 3(2,3)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

AGRICULTURAL MECHANIZATION (AGM)

Professors: J. M. Bunn, J. T. Craig, T. H. Garner, R. O. Hegg, C. E. Hood, Jr., J. T. Ligon, E. J. Middlebrooks, B. K. Webb, *Head;* R. E. Williamson, T. V. Wilson; *Associate Professors:* W. H. Allen, G. E. Miles; *Assistant Professors:* J. A. Collier, J. B. Davis, M. J. Delwiche, F. A. Payne; *Instructor:* R. B. Dodd

205 Principles of Farm Shop 3(2,3) Principles, techniques, and methods in the selection, proper use and maintenance of hand and power tools. Principal topics include welding, tool fitting, metalwork, woodworking, finishing and preserving, pipe fitting, and farm masonry.

206 Agricultural Mechanization 3(2,3) The agricultural student is taught to apply physical principles and sound reasoning to the mechanization of modern agricultural production and processing enterprises. Planning efficient operational systems and wise selection of equipment, based on function and economic suitability are stressed. *Preq:* MTHSC 105, PHYS 207 or consent of instructor.

301 Soil and Water Conservation 3(2,3) Water management in agriculture is studied by applying principles of elementary surveying, mathematics and fluid flow as related to soil-water-vegetation complexes in erosion control, conservation, drainage, and irrigation.

302 Rainfall, Runoff, and Erosion Control 3(2,3) Precipitation causes, characteristics and distribution are covered. Resulting runoff rates and volumes as influenced by watershed characteristics are studied, including methods of controlling runoff and erosion by vegetative and mechanical means. Sufficient elementary surveying is included to assure proper application of principles in the design of soil and water conservation practices. Not open to students who have completed AGM 301.

303 Calculations for Mechanized Agriculture 3(2,3) Course designed to enhance the student's ability to analyze and solve a wide range of problems requiring engineering technology. Laboratory periods will be used to introduce the student to microcomputer hardware. Basic programming, and typical applications to agricultural mechanization problems. *Preq:* PHYS 207 or consent of instructor.

402, 602 Drainage, Irrigation, and Waste Management 3(2,3) Continuation of AGM 302. Basic soil-water-plant relationships are used to determine the need for and methods of irrigation, drainage, and waste management. Topics covered will include irrigation methods, drainage needs, drainage methods, and waste-treatment methods. *Preq:* AGM 302.

404 Farm Structures 3(2,3) Farmstead planning, including space and environmental needs for livestock and poultry. Additional topics include elements of crop processing, materials handling, and animal waste disposal. *Preq:* PHYS 207 or consent of instructor.

406, 606 Mechanical and Hydraulic Systems 3(2,3) This course deals with power transmission systems for agricultural production with emphasis on mobile equipment. The characteristics, requirements, and design of both V-belt drive and roller-chain drives are presented. Emphasis is placed on hydraulic power transmission systems, including pumps, actuators, control devices, and hydraulic circuitry. *Preq:* AGM 206, PHYS 207 or consent of instructor.

408 Equipment Sales and Service 3(3,0) Agricultural equipment sales and service techniques, inventory and accounting procedures followed by the farm machinery industry.

452, 652 Farm Power 3(2,3) A study of tractors with emphasis upon internal combustion engine principles and the support systems necessary for its proper functioning. The application of power, maintenance, adjustment, and general repair are also considered. *Preq:* PHYS 207 or consent of instructor.

460, 660 Farm and Home Utilities 3(2,3) A course for undergradute and graduate students in Agriculture and related curricula, involving a study of electric and other utilities on the farm and in the home. Selection, installation, and maintenance of wiring systems, lighting systems, motors, controls, water systems, and waste disposal systems are emphasized. *Preq:* PHYS 208 or consent of instructor, Junior standing.

472 Seminar 1(1,0) The student will be introduced to the agribusiness world, professionalism, current topics of special interest, and financial and legal implications of modern agricultural production. *Preq:* Senior standing in Agricultural Mechanization and Business or consent of instructor.

712 Farm Machinery Management 3(2,3)

733 Analysis of Agristructures 3(3,0)

771 Selected Topics in Agricultural Mechanization 1-3(1-3,0)

781 Special Problems 1-3(1-3,0)

851 Simulation of Agricultural Systems 3(3,0)

AGRICULTURE (AGRIC)

Professors: B. D. Barnett, G. R. Craddock, O. J. Dickerson, J. E. Faris, S. B. Hays, J. W. Hubbard, M. W. Jutras, J. R. Woodruff; *Assistant Professor:* R. G. Godbee II: *Visiting Professor:* M. A. Boone

103 Introduction to Animal Industries 3(2,3)F, S Fundamental and descriptive aspects of the animal industries as applied biology and major segments of food production and distribution

systems. The subject matter will be presented by Animal Science, Dairy Science, and Poultry Science Departments.

104, H104 Introduction to Plant Sciences 3(2,3)F, S A fundamental course in plant sciences, including agronomic and horticultural crops of the major agricultural areas of the world and emphasizing the crops of South Carolina. The laboratory exercises are self-tutorial.

301 International Agriculture 3(3,0)F This course is designed to acquaint the student with the systems of agriculture of the world. The approach is evolutionary. Main emphasis is on production as related to world climates and world population. Various geographical areas are considered. *Preq:* AGEC 202 or ECON 211.

401 International Agriculture Seminar 1(1,0)S A colloquium of current issues in world agriculture. Topics include population growth, food policy, technology transfer, and international trade. With permission of instructor, the course may be repeated for a total of two credits.

H491 Senior Honors Research 3(1,6) Senior Division Honors research in an agricultural sciences curriculum. Open to approved Honors Program students only. In consultation with and under the direction of a professor, the student will select a research topic, conduct experiments, record data, and make an oral presentation of results to the College Honors Program Committee.

H492 Senior Honors Research 3(1,6) Continuation of AGRIC H491. Senior Division Honors research in an agricultural sciences curriculum. Upon termination of the research project, the student will submit a formal written report and make a final oral presentation of results to the College Honors Program Committee. Professor-student discussions of additional topics will be arranged.

AGRONOMY—CROPS AND SOILS (AGRON)

Professors: G. R. Craddock, *Head;* B. J. Gossett, W. D. Graham, Jr., U. S. Jones, M. W. Jutras, J. A. Martini, E. A. Rupert, H. D. Skipper, J. R. Woodruff; *Associate Professors:* E. B. Eskew, V. L. Quisenberry, J. S. Rice, B. R. Smith; *Assistant Professors:* S. C. Hodges, E. R. Shipe, S. U. Wallace

202 Soils 3(2,2)F, S An introduction to world land resources, soil formation, classification, and mineralogy. Emphasis is placed upon the basic chemical and physical properties of soil. Soil microorganisms, plant nutrients, and fertilization are discussed. Soil properties are related to plant growth. *Preq:* CH 101, 102, or a geology sequence including GEOL 101, or consent of instructor.

301 Fertilizers 2(2,0) World production, marketing, and use of minerals and chemicals essential for plant growth are considered. The interdependence of food, fuel, and fertilizer is analyzed. Production and use of fertilizers are emphasized. *Preq:* AGRON 202 or consent of instructor.

350 Practicum 1-3 Preplanned internship undertaken with an approved agency concerned with agronomic practices. Restricted to students with a major or minor in Agronomy. Maximum of three credits allowed. *Preq:* Consent of department head.

402, 602 Land Pollution Control 3(3,0)S, Odd-numbered years. Application of the principles of soil science to the use of land for disposal of pollutants and wastes from an increasing population of animals, plants, and man. Waste utilization, waste disposal methods, and capacity of land to consume wastes will be discussed. *Preq:* AGRON 202, 403, or consent of instructor.

403, 603 Soil Genesis and Classification 2(1,3)F Study of soil morphology and characterization, pedogenic processes, soil-forming factors, and classification of soils. *Preq:* AGRON 202 or consent of instructor.

404, 604 Soils and Land Use 2(1,3)F Soils interpretations for nonagricultural purposes and facilities. Emphasis upon use of modern soil surveys and properties and features of soils important in nonfarm land uses. Not open to Agronomy majors or minors or to students who have had AGRON 202.

405, 605 Plant Breeding 3(2,2)S The application of genetic principles to the development of improved crop plants. Principal topics include the genetic and cytogenetic basis of plant breeding, mode of reproduction, techniques in selfing and crossing, methods of breeding, inheritance in the major crops, and biometrical methods. *Preq:* GEN 302 or equivalent.

406 Special Problems 1-2(0,3-6) Course designed to acquaint undergraduate students with the scientific method. Literature investigation, planning, and execution of an experiment are integral parts of the course. Not available to AGRIC H491 and H492 students. Maximum of 4 credits allowed. *Preq:* Senior standing as a major or minor in Agronomy and consent of department head.

407, H407, 607 Principles of Weed Control 3(2,2)F Weeds, their introduction, ecology, methods of reproduction, dissemination, and control; chemistry and mode of action of herbicides, equipment and techniques of application; a characterization of the common weeds of the Southeast. Admission to Honors section by invitation only. *Preq:* AGRIC 104, AGRON 202, or consent of instructor.

408, 608 Advanced Weed Science Laboratory 1(0,2)S Problems and special topics in weed science with emphasis on the identification of seedling and mature economic weed pests not included in AGRON 407. *Preq:* AGRON 407.

421, 621 Field Crops—Monocots and Specialty Crops 3(3,0)F The principles involved in the production and utilization of corn, wheat, oats, barley, rye, sorghum, rice and the millets, with special emphasis on their importance in South Carolina agriculture. The role of other oil, fiber, seed, drug, sugar, and other crops will be treated from the standpoint of worldwide production and utilization. *Preq:* AGRIC 104, AGRON 202.

422, 622 Field Crops—Dicots 3(3,0)S The principles involved in the production and utilization of cotton, soybeans, tobacco, and peanuts with special emphasis on their importance in South Carolina agriculture. *Preq:* AGRIC 104, AGRON 202.

423, H423, 623 Field Crops—Forages 3(3,0)S The characteristics, establishment, utilization, and maintenance of crops for hay, silage, and pasture. Crops valuable in South Carolina are emphasized. Admission to Honors section by invitation only. *Preq:* AGRIC 104, AGRON 202, or consent of instructor.

424, 624 Advanced Field Crops Laboratory 1(0,2)S Identification and management of the important forage and row crops of the Southeast, nation, and the world. Course is self-tutorial. *Preq:* AGRIC 104.

425, 625 Seed Science and Technology 3(2,2)S Topics include seed development, germination, dormancy, pathology, storage, and deterioration. Seed testing and commercial production of seed are also covered. Emphasis will be placed on useful applications of current seed science knowledge. *Preq:* AGRIC 104, BOT 205.

452, 652 Soil Fertility and Management 3(3,0) Soil properties, climatic factors, and management systems in relation to soil fertility maintenance for crop production. Plant nutrition and growth in relation to crop fertilization and soil management. *Preq:* AGRON 202 or consent of instructor.

453, H453, 653 Soil Fertility Laboratory 1(0,3)S The evaluation and interpretation of soil fertility and plant nutrition by laboratory diagnostic methods used in the management of soils for crop production. *Preq:* AGRON 202 or consent of instructor.

455 Seminar 1(1,0)F Student presentation of current agronomic topics of special interest in crop production appearing in recent scientific journals and other publications.

456 Seminar 1(1,0)S Student presentation of current topics of special interest in the field of soil science appearing in recent scientific journals and other publications.

475, H475, 675 Soil Physics and Chemistry 3(2,3)S A study of the principles of soil physics and chemistry and their applications. Topics include soil texture, structure, compaction, water relations, solute movement, mineral composition, adsorption phenomenon, and soil acidity. *Preq:* AGRON 202, CH 101, 112, PHYS 207.

490, 690 Soil Organisms in Crop Production 3(2,3)F Interrelationships of soil organisms, soil properties, and crop production. Aspects of biological nitrogen fixation, mycorrhizae, and microbial-pesticide interactions. Biochemical and nutrient transformations related to plant growth. *Preq:* AGRON 202, MICRO 305, PLPA 301, or consent of instructor.

801 Crop Physiology and Nutrition 3(3,0)

802 Pedology 3(3,0)

804 Theory and Methods of Plant Breeding 3(3,0)

805 Soil Fertility 3(3,0)

806 Special Problems 1-3(0,3-9)

807 Soil Physics 4(3,3)

808 Soil Chemistry 3(2,3)

812 Crop Ecology and Land Use 3(3,0)

820 Pesticide Residues in the Environment 3(3,0)

825 Seminar 1(1,0)

890 Special Topics in Agronomy 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

AMERICAN STUDIES (AMST)

Associate Professor: J. W. Johnson

300 American Culture 3(3,0) An examination of the major works in the field of American studies, emphasizing the genesis, growth, and varied nature of interdisciplinary American writing in the last fifty years. *Preq:* Sophomore standing.

400 Topics in American Studies 3(3,0) Study of selected issues or concerns in American life from an interdisciplinary point of view. *Preq:* Sophomore standing.

ANIMAL PHYSIOLOGY (ANPH)

(See courses listed under Animal Science, Dairy Science, Entomology, Poultry Science, and Zoology)

Professors: B. D. Barnett, J. F. Dickey, L. T. Frobish, D. M. Henricks, B. L. Hughes, J. H. Martin, D. E. Turk; *Associate Professors:* J. R. Diehl, J. C. Spitzer, R. J. Thurston; *Assistant Professors:* G. P. Birrenkott, Jr., J. M. Colacino, J. W. Foltz, T. Gimenez

301 Physiology and Anatomy of Domestic Animals 3(2,3) Physiology and associated anatomy of the body systems, including nervous, skeletal and muscular, respiratory, digestive, circulatory, urinary, reproductive, and endocrine systems. This course is designed primarily for students in Animal Science, Dairy Science, and Poultry Science. *Preq:* BIOL 103, 104, 105, 106 or 110, 111.

460, H460, 660 Systems Physiology 4(3,3) Physiology of the endocrine, digestive, excretory, and reproductive systems. *Preq:* ANPH 301, ZOOL 202, 340, 459, or consent of instructor.

801 Electron Microscopy of Biological Specimens 3(1,6)

806 Experimental Animal Physiology 3(1,6)

807 Special Problems in Animal Physiology 1-3

808 Mammalian and Avian Endocrinology 3(3,0)

812 Digestive-Metabolic, Excretory and Respiratory Physiology 5(4,3)

814 Membrane, Cardiovascular and Neuro-Muscular Physiology 5(4,3)

851 Animal Physiology Seminar 1(1,0)

991 Doctoral Research. Credit to be arranged.

ANIMAL SCIENCE (ANSC)

Professors: D. L. Cross, R. L. Edwards, L. T. Frobish, *Head;* G. C. Skelley, Jr., C. E. Thompson; *Associate Professors:* J. R. Diehl, D. L. Handlin, J. C. McConnell, Jr., J. C. Spitzer; *Assistant Professors:* T. Gimenez, R. G. Godbee II

202 Introduction to Animal Science 3 (2,3) This course deals with basic principles concerning the breeding, feeding, management, and marketing of beef cattle, swine, and horses. The laboratory is

designed to demonstrate the basic elements of livestock breeding, feeding, and management. Beef cattle, swine, and horses will be used. Evaluation of slaughter animals and carcasses is included.

205 Light Horse Management 2(1,3) The light horse industry—development of breeds and their uses. Breeding, feeding, and management of light horses. Fundamental instruction in equitation.

301, H301 Feeds and Feeding 3(2,3)F, S Feeds, nutrients, digestion, metabolism of feedstuffs, feeding standards, and balancing of rations. *Preq:* ANSC 202 or equivalent and CH 201, or consent of instructor.

303 Livestock Evaluation 2(1,3) This course is concerned with identification and determination of body traits that will ultimately affect the market grades and economic value of live animals and their carcasses. *Preq.* ANSC 202.

305 Meat Grading and Selection 2(1,3)F, Even-numbered years. Classification, grading and selection of beef, lamb and pork carcasses, and wholesale cuts; and factors influencing quality and value will be studied. Students enrolled in this course are eligible to compete in Intercollegiate Meat Judging Contests. *Preq:* ANSC 202.

306 Livestock Selection and Judging 2(1,3)S Selection and breed characteristics of beef cattle, sheep, swine, and horses will be studied. Livestock terms useful for livestock breeders will be used. Students enrolled in this course are eligible to compete in the Southeastern Intercollegiate Livestock Judging Contest. *Preq:* ANSC 202, 303.

310 Animal Disease and Sanitation 2(2,0) Principles of sanitation; disease prevention and control; common ailments of cattle, swine, and horses; and the nature of the disease process will be explained. *Preq:* ANSC 202.

351 Meat Identification and Utilization 1(0,3) Selection of meat and identification of cuts, processing techniques, nutritive value, meat preservation, research techniques, muscles, and bones.

353, H353 Meats 2(2,0)F The chemical and physical composition of meat, meat hygiene, nutritive value, curing, freezing, and meat by-products. *Preq:* ANSC 202.

355 Meats Laboratory 1(0,3)F The selection and grading of meat animals and carcasses. Practical work in slaughtering of animals and in the cutting, curing, and freezing of meats. Emphasis is placed on the identification of wholesale and retail cuts. *Preq:* ANSC 202.

360 Livestock Practicum 1-3 Preplanned internship with an approved industry concerned with livestock production, processing, or distribution. The student will submit monthly reports and conduct a seminar. *Preq:* Junior standing, Animal Science major, or consent of department head.

401, H401, 601 Beef Production 3(3,0)F Breeding, feeding, management, and grading of beef cattle. Emphasis is placed on year-round grazing. *Preq:* ANSC 301 or consent of instructor.

403, H403, 603 Beef Production Laboratory 1(0,3)F Practical application of beef production practices. *Preq:* ANSC 301 or consent of instructor.

405 Advanced Livestock Selection and Evaluation 1(0,3)F, Odd-numbered years. Continuation of ANSC 306 for students who are interested in participating in judging contests or in receiving special training in the selection of breeding cattle, sheep, and swine. Judging and grading of market classes are considered. *Preq:* ANSC 306.

406 Seminar 2(2,0)S Special problems in animal production. Each student is given a subject on which he makes weekly reports before a seminar group. *Preq:* ANSC 301 or consent of instructor.

408, H408, 608 Pork Production 3(3,0)S Feeding, breeding, management, and marketing of hogs. Emphasis is placed on winter and summer forages, protein supplements, mineral mixtures, and sanitation practices. *Preq:* ANSC 301 or consent of instructor.

410, H410, 610 Pork Production Laboratory 1(0,3)S Practical application of swine production practices are demonstrated. Grading, selection, feeding, management, and care of swine are given attention. *Preq:* ANSC 301 or consent of instructor.

412, H412 Horse Science 3(2,3) Anatomy and physiology of the horse, emphasizing nutrition reproduction, genetics, and management. Selection, unsoundness, parasites, and diseases are discussed. *Preq:* ANSC 202 or consent of instructor.

422 Special Problems 1-3(0,3-9) Topics of interest to the student during the junior or senior year The course will give experience with livestock problems not covered in other courses. *Preq:* Junio or Senior standing, consent of department head and instructor.

452, H452, 652 Animal Breeding 3(3,0)S The fundamental principles relating to the breeding and improvement of livestock including variation, heredity, selection, linebreeding, inbreeding, cross breeding, and other related subjects. *Preq:* GEN 302.

802 Topical Problems 1-3(1-3,0)

803 Meat Technology 3(3,0)

804 Methods in Animal Breeding 3(3,0)

805 Nutrition of Meat Animals 3(3,0)

891 Master's Research. Credit to be arranged.

ANTHROPOLOGY (ANTH)

Assistant Professor: M. E. White

201 Introduction to Anthropology 3(3,0) Humans as biosocial animals, including the theory of evolution and the archaeological evidence of physical and cultural development; emphasis on the relation of human beings to the environment.

301 Cultural Anthropology 3(3,0) The nature of human culture; the constants and variants in human behavior affecting technology, social relations, social control, family systems, language, religion and art. *Preq:* ANTH 201 or consent of instructor.

310 Archaeology of the Southeastern American Indians 3(3,0) The cultural prehistory of the Southeastern United States, including developments in each time period: evidence of intra- and interregional trade, agriculture, and societal complexity. *Preq:* ANTH 201 or consent of instructor.

320 North American Indian Cultures 3(3,0) American Indian ethnography, using the culture area approach in studying adaptations of native peoples; includes a brief survey of American Indians today. *Preq:* ANTH 201 or consent of instructor.

ARCHITECTURAL STUDIES
ARCHITECTURE (CAAR)

Professors: D. L. Collins, J. E. Dalton, J. P. Holschneider, P. R. Lee, H. E. McClure, G. C. Means, Jr., F. G. Roth, K. J. Russo, *Head;* G. B. Witherspoon, J. L. Young; *Associate Professors:* L. G. Craig, M. A. Davis, R. D. Eflin, J. D. Jacques, Y. Kishimoto, R. B. Norman, G. W. Patterson, G. M. Polk, Jr., G. L. Walker; *Assistant Professor:* M. R. Hudson; *Lecturers:* R. J. Miller, K. J. Pflieger; *Visiting Professor:* D. J. Hutton

421 Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental and technological considerations in architecture and the building industry. *Preq:* Senior standing or consent of instructor.

424, 624 Furniture and Industrial Product Design 3(1,4) The course will cover the design of furniture, special products or a product system for interior and exterior spaces. There will be opportunities for indepth studies offered in ergonomics, interior design, and urban space object design. *Preq:* CADS 352.

425, 625 Energy Criteria for Architectural Design 3(3,0) Course will investigate current consumption trends in energy and their impact on the design professions. Methods of energy-conscious design will be highlighted and the influence on regional climatic architectural and planning solutions will be studied. *Preq:* CABS 304, CADS 352.

481, 681 Architectural Office Practice 3(3,0) General consideration of architectural office procedure. Study of the professional relationship of the architect to client and contractor, including problems of ethics, law, and business. *Preq:* Consent of instructor.

485, 685 Health Care Delivery Systems and Health Care Facilities Seminar 3(3,0) This course introduces the concepts, organization, and direction of health and health-care services within the context of health-care delivery systems. Special emphasis is placed on mental and physical health-care facilities concepts. *Preq:* Consent of instructor.

488, 688 Health Care Facilities Programming Techniques 3(2,3) Seminar on recent research and innovations in health-care facilities programming, and original investigation of assigned programming problems. *Preq:* Consent of instructor.

490 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current developments in architecture. *Preq:* Consent of department head.

557 Architectural Design 9(3,18) City planning design and the development of complex building solutions. *Preq:* Admission to the Bachelor of Architecture program.

558 Architectural Design 9(3,18) The programming and solution of complex building design problems including interior and site development. *Preq:* CAAR 557.

559 Terminal Project in Architecture 9(1,24) The student will select an appropriate architectural problem, conduct adequate research, prepare a comprehensive program, and make a complete oral, written and visual presentation of his solution. *Preq:* CAAR 558.

801 Professional Practice Seminar 3(3,0)

853 Architectural Design 6-9(0,18-27)

854 Architectural Design 6-9(0,18-27)

857 Architectural Design 9(0,27)

858 Preliminary Thesis or Terminal Project 3(1,6)

859 Terminal Project 1-12(0,3-36)

886 Health Care Facilities Components and Functions 3(2,3)

890 Directed Studies 1-5

891 Architectural Thesis 1-12

ARCHITECTURE OVERSEAS PROGRAM (CA)

Professor: C. Fera

At the Overseas Center for Building Research and Urban Study in Genoa, Italy, courses are offered to fifth-year students in Architecture, City and Regional Planning, and Visual Arts and fourth-year students in Building Science and Management.

412, 612 Directed Research in Architectural History 3(1,6) Original investigations and research related to specific history structures; studies may include measured drawings, restoration and proposals for adaptive use. Required course for all participants of the Overseas Program. *Preq:* Postgraduate or graduate standing in the College of Architecture, Senior standing in Building Science and Management, or acceptance in the Bachelor of Architecture program.

420, 620 Visual Studio 3(0,9) Field drawing and sketching and other documentation of important European architectural and landscape subjects. The course content will include gallery visits and adjunct lectures. (May be substituted for one semester of undergraduate or graduate visual arts studio.) *Preq:* Postgraduate or graduate standing in the College of Architecture, Senior standing in Building Science and Management, or acceptance in the Bachelor of Architecture program.

442, 642 Building Science Studio 1-9(0-3,3-18) Comparative studies of European and American methods of building construction and construction management—may include travel and appropriate research in the field—a definitive written or graphic report is required. (May be substituted

for CABS 403 and 442 or other courses as approved.) *Preq:* Senior standing in Building Science and Management.

550 Architectural Studio 1-9(3,18) Comprehensive architectural studio programs for central city structures. Problems will be related to other studio project areas concurrent in Overseas Center. (May be substituted for CAAR 557, 558. Limited to Bachelor of Architecture degree candidates or postgraduates.) *Preq:* Postgraduate standing in the College of Architecture or acceptance in the Bachelor of Architecture program.

850 Architectural Studio 1-9(0-3,3-18)

860 Planning Studio 1-9(0-3,3-18)

880 Visual Arts Studio 1-9(0-3,3-18)

ART AND ARCHITECTURAL HISTORY (CAAH)

Professor: H. N. Cooledge, Jr.; *Associate Professor:* E. C. Voelker; *Assistant Professor:* J. B. Mulholland; *Adjunct Professor:* R. D. England

115 History of Art and Architecture I 3(3,0) Total environment: its demands and restrictions as evidenced by the building and planning of men from ancient time to the present.

116 History of Art and Architecture II 3(3,0) Continuation of CAAH 115. *Preq:* CAAH 115.

215 History of Art and Architecture III 3(3,0) Cultural focus: its problems and expression as evidenced by selected examples of architecture and planning from ancient times to the present, considered in depth. *Preq:* CAAH 116.

216 History of Art and Architecture IV 3(3,0) Continuation of CAAH 215. *Preq:* CAAH 215.

303 Evolution of Visual Arts I 3(3,0) A consideration of man's necessity for and development of the visual arts in the Western World from ancient times to the Renaissance. Illustrated lectures and collateral reading.

304 Evolution of Visual Arts II 3(3,0) Development and utilization of the visual arts in the Western World from the Renaissance through modern times; illustrated lectures and collateral reading.

305 Man and the Built Environment 3(3,0) Review of roots of contemporary architecture and current problems that face man individually and socially in the built environment. The course will consist of lectures, special projects and reports, and selected readings in historical and contemporary design influence. (Not open to Design majors.)

403, 603 History of Modern Architectural Movement 3(3,0) A seminar in the analysis and criticism of architectural and town building works. The course sequence will include historic and contemporary examples, literary searches, field trips, essays, and oral reports. *Preq:* Senior standing or consent of instructor.

404, 604 Current Directions in Architecture 3(3,0) The critical analysis of the development and current directions of modern movements in architecture. *Preq:* Senior standing or consent of instructor.

405, 605 History of Planning and Cities 3(3,0) This course is intended to familiarize professional students in the environmental design disciplines concerning the origin, development, and growth of cities to enable them to understand the ever accelerating growth of urbanism and the increasing complexity of urban organism. *Preq:* Consent of instructor or department head.

411, 611 Directed Research in Art and Architectural History 3(3,0) Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current developments in art history.

412, 612 Directed Research in Art and Architectural History 3(3,0) Continuation of CAAH 411.

413, 613 Twentieth Century Visual Arts 3(3,0) A consideration of the visual arts in the 20th century in relation to the factors that have influenced the artist and the consequence of his/her production to society.

417, 617 Studies in the Art and Architecture of the Ancient World I 3(3,0) Consideration of the visual arts and architectural monuments of the Ancient World (Egypt, the Near East, Greece, and

Rome) with a study in depth of selected examples from the period. *Preq:* CAAH 216 or consent of instructor.

418, 618 Studies in the Art and Architecture of the Ancient World II 3(3,0) A consideration of the visual arts and architectural monuments of the Ancient World (Egypt, the Near East, Greece, and Rome), with a study in depth of selected examples from the period. *Preq:* CAAH 417.

419, 619 Studies in the Art and Architecture of the Early Middle Ages 3(3,0) A consideration of the visual arts and architectural monuments of the Early Middle Ages (Byzantium and Western Europe from the 4th through 12th centuries), with a study in depth of selected examples from the period. *Preq:* CAAH 216 or consent of instructor.

420, 620 Studies in the Art and Architecture of the Late Middle Ages 3(3,0) A consideration of the visual arts and architectural monuments of the Late Middle Ages (Western Europe from the 12th through the 15th centuries), with a study in depth of selected examples from the period. *Preq:* CAAH 419.

423, 623 Studies in the Art and Architecture of the Renaissance I 3(3,0) A consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th through the 18th centuries), with a study in depth of selected examples from the period. *Preq:* CAAH 216 or consent of instructor.

424, 624 Studies in the Art and Architecture of the Renaissance II 3(3,0) A consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th through the 18th centuries), with a study in depth of selected examples from the period. *Preq:* CAAH 423.

427, 627 Eighteenth Century Visual Arts 3(3,0) A consideration of the visual arts: sculpture, painting, graphics, and furnishings of the 18th century in its environment, together with its precursors and later influence (1785-1815). *Preq:* CAAH 216.

428 628 Nineteenth Century Visual Arts 3(3,0) A consideration of the visual arts of the 19th century: painting, sculpture, printmaking, ceramics, and so forth, in relation to the factors that have influenced the artist and his/her consequence on society. *Preq:* CAAH 427.

429, 629 Studies in the Art and Architecture of India and the Far East 3(3,0) A consideration of the visual arts and architectural monuments of India and the Far East, with a study in depth of selected examples from the period. *Preq:* CAAH 216 or consent of instructor.

815 Art and Architectural History Seminar I 3(3,0)

816 Art and Architectural History Seminar II 3(3,0)

BUILDING SCIENCE (CABS)

Professor: N. L. Book, L. H. Brown, R. E. Knowland, *Head;* H. W. Webb; *Associate Professors:* C. L. Addison, M. D. Egan; *Visiting Professor:* A. J. Kaufmann; *Visiting Instructor:* D. A. Hambrecht

201 Building Science 3(2,3) A study of skills required for the application of building science technology including structural concepts, methods and materials, and environmental systems. *Preq:* MTHSC 106.

202 Building Science 3(2,3) A study of skills required for the application of building science technology including structural concepts, methods and materials, and environmental systems. *Preq:* CABS 201.

303 Building Science 3(3,0) Theory and design of simple determinate steel and wood structures with an emphasis on the conceptual understanding of structural systems. *Preq:* CABS 202.

304 Building Science 3(3,0) Theory of acoustical design and control in the built environment. Theory of human thermal comfort and principles of heating and air conditioning buildings. *Preq:* Junior standing.

311 Contract Documents 3(3,0) Introduction to working drawings, specifications and the various documents required to carry out a typical construction project. *Preq:* Junior standing.

312 Construction Feasibility Studies 3(3,0) A study of risk costs and return as factors impinging upon the feasibility of construction projects. *Preq:* ECON 212 or consent of instructor.

351 Construction Management I 3(0,9) Introduction to construction methods and materials. Purpose of estimates, conceptual estimates, and detailed quantity surveys. *Preq:* Junior standing. *Coreq:* CABS 311.

352 Construction Management II 3(0,9) Analysis of construction projects with emphasis on estimating, scheduling, and resource leveling. *Preq:* CABS 311, 351.

403 Building Science 3(3,0) Theory of illumination for the built environment. Basic theory of fire protection and life safety in buildings. Design concepts for building energy conservation.

404 Building Science 3(3,0) Theory and design of simple reinforced concrete structures with an emphasis on the conceptual understanding of structural systems. *Preq:* CABS 303.

411 Construction Equipment 3(3,0) Selection, financing, and management of construction equipment. *Preq:* CABS 312.

412 Foundation and Formwork 3(3,0) Design and construction of foundations and reinforced concrete formwork. *Preq:* CABS 411.

451 Construction Management III 3(0,9) Study of labor-management relations in the construction industry, field organization, subcontractor relationships, supervision, safety, and productivity. *Preq:* CABS 352.

452 Construction Management IV 3(0,9) Study of construction business organization, policy, financial management, project management, and cost control. *Preq:* CABS 451.

461, 661 Construction Economic Seminar 3(3,0) Studies in urban and building economics.

471, 671 Architectural Structures 3(3,0) The examination and evaluation of structural systems with emphasis on the compatibility and constraints exerted on architectural design goals. *Preq:* CABS 404.

472, 672 Architectural Structures 3(3,0) Continuation of CABS 471. *Preq:* CABS 471.

475, 675 Building Equipment and Systems 3(3,0) The investigation of special topics in mechanical, electrical, illumination, and acoustical systems for buildings. *Preq:* CABS 304.

476, 676 Design for Natural Hazards 3(3,0) Basic principles of design for natural hazards to the built environment. Wind (hurricane, tornado, cyclone); water (flood, seiche, tsunami); seismic (shaking, faulting, landslide, liquefaction); and fire (vegetation, exposing structures, lightning). Weather characteristics and geological conditions, site and land-use planning, and hazard forces and hazard-resistant design fundamentals. *Preq:* CABS 403.

490 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current development in building science. *Preq:* Consent of instructor.

INTERDISCIPLINARY STUDIES (CADS)

151 Design Studies 4(2,6) An introduction to concepts and principles of architecture, construction, and visual arts through lectures, demonstrations, and studio exercises.

152 Design Studies 4(2,6) Continuation of CADS 151.

251 Design Studies 7(2,15) Studio work with adjunct demonstrations and lectures concerned with basic architectural design problems. *Preq:* CADS 152.

252 Design Studies 7(2,15) Continuation of CADS 251. *Preq:* CADS 251.

351 Design Studies 7(2,15) Studio work with adjunct demonstrations and lectures concerned with intermediate architectural design problems. *Preq:* CADS 252.

352 Design Studies 7(2,15) Continuation of CADS 351.

451 Design Studies 7(2,15) Studio work with adjunct demonstrations and lectures concerned with advanced architectural design problems. *Preq:* CADS 352.

452 Design Studies 7(2,15) Continuation of CADS 451.

PLANNING STUDIES (CAPL)

Professor: E. L. Falk, *Head; Associate Professors:* J. R. Caban, O. Ersenkal, B. C. Nocks, G. E. Varenhorst

411, 611 Introduction to City and Regional Planning 3(3,0) The purpose of the course is to introduce students from a variety of disciplines to City and Regional Planning. Spatial and nonspatial areas of the discipline will be explored through a wide ranging lecture/seminar program. *Preq:* Consent of instructor or department head.

472, 672 Implementation of the Local Planning Process 3(3,0) The organization and administration of types of planning agencies and their relationship to other governmental and private organizations. *Preq:* Consent of instructor or department head.

473, 673 Government and Planning Law 3(3,0) Complete coverage of the laws and ordinances relating to redevelopment, subdivision control, zoning, official mapping, and other topics including interpretation, philosophy, enabling legislation and model ordinances. The legal basis of current and long-range planning policy will be discussed. *Preq:* Consent of instructor or department head.

483, 683 Seminar on Planning Communication 3(3,0) Informal means open for plan implementation. The organization of effective public information and education programs, use of citizen advisory committees, and application of other implementation techniques. *Preq:* Consent of instructor or department head.

812 City and Regional Planning Theory 3(3,0)

821 Intergovernmental Relations in the Planning Process 1-3(1-3,0)

822 Urban Systems and Design 3(3,0)

823 Social and Planning and Delivery Systems 3(3,0)

831 Principles of Site Planning and Design 3(3,0)

832 Problems in Site Planning 3(1,2)

853 Comparative Studies in Planning Methods and Analysis 3(0,9)

854 Planning and Built Form Studies Studio 3(0,9)

858 Preliminary Planning Thesis 3(0,9)

859 Planning Terminal Project 3(0,9)

862 Citizen Participation in Planning 3(3,0)

863 Urban and Metropolitan Planning Studies Studio 3-6(0,9-18)

865 Advanced Landuse and Built Form Studies Studio 3-9(0,9-27)

871 Seminar on Planning and Management of Change 3(3,0)

881 Quantitative Methods and Urban Planning and Policy 3(3,0)

882 Seminar in Mathematical Modeling for Urban and Regional Planning 3(3,0)

883 Techniques for Analyzing Development Impacts 3(0,9)

884 Public Services and Facilities Planning 3(3,0)

885 City and Regional Financial Planning 3(3,0)

889 Selected Topics in Planning 3(3,0)

890 Directed Studies in City and Regional Planning 1-5(0,1-5)

891 Planning Thesis 3-9

893 City and Regional Planning Internship 6(0,6)

VISUAL ARTS (CAVA)

Professors: J. T. Acorn, *Head;* R. H. Hunter, I. G. Regnier, S. Wang; *Assistant Professors:* S. A. Cross, T. Dimond, M. R. Hudson, J. A. Stockham, M. V. Vatalaro

203 Visual Arts Studio 3(1,6) Studio work in visual elements and their organizations, form, line, texture, space, light, and color. Principles of design and formal organization of visual arts.

205 Beginning Drawing 3(1,6) Studio work in drawing and related media. *Preq:* CADS 152 or CAVA 203.

207 Beginning Painting 3(1,6) Studio work in painting and related media. *Preq:* CADS 152 or CAVA 203.

209 Beginning Sculpture 3(1,6) Studio work in sculpture and related media. *Preq:* CADS 152 or CAVA 203.

211 Beginning Printmaking 3(1,6) Studio work in lithography, silk screen, woodcuts, and graphics and related media. *Preq:* CADS 152 or CAVA 203.

213 Beginning Photography 3(1,6) Studio work in photography and related media. *Preq:* CADS 152 or CAVA 203.

215 Beginning Graphic Design 3(1,6) Study and studio work with historical, contemporary, and experimental letter forms. Emphasis is placed on the application of letter design components to convey visual images and ideas beyond normal word and sentence formulation. *Preq:* CADS 152 or CAVA 203.

217 Beginning Ceramics 3(1,6) Applied studio work in ceramic hand building and pottery; creative experience in process of forming, decorating, glazing, and firing. *Preq:* CADS 152 or CAVA 203.

305 Drawing 3(1,6) Studio work in drawing and related media. *Preq:* CAVA 205.

307 Painting 3(1,6) Studio work in painting and related media. *Preq:* CAVA 207.

309 Sculpture 3(1,6) Studio work in sculpture and related media. *Preq:* CAVA 209.

311 Printmaking 3(1,6) Studio work in lithography, silk screen, etching, woodcuts and related media. *Preq:* CAVA 211.

313 Photography 3(1,6) Studio work in still photography and related media. *Preq:* CAVA 213.

315 Graphic Design 3(1,6) Study and studio work in layout, composition, illustration, investigation of studio skills; terminology and theories of layout and composition; emphasis on the different graphic formats and their use in advertising art. *Preq:* CAVA 215.

317 Ceramic Arts 3(1,6) Continuation of CAVA 217. *Preq:* CAVA 217.

405, 605 Drawing 3(0,9) Studio work in advanced drawing and related media. *Preq:* CAVA 305.

407, 607 Painting 3(0,9) Studio work in advanced painting and related media. *Preq:* CAVA 307.

409, 609 Sculpture 3(0,9) Advanced studio work in sculpture and related media. *Preq:* CAVA 309.

411, 611 Printmaking 3(0,9) Advanced studio in printmaking and related media. *Preq:* CAVA 311.

413, 613 Photography 3(0,9) Advanced studio work in photography. *Preq:* CAVA 313.

415, 615 Graphic Design 3(0,9) Utilization of graphic, scenic, and other visual design requirements for motion picture and television. Emphasis on imagination and use of visual design in relation to media and function: entertainment, documentary, institutional, or advertising. *Preq:* CAVA 315.

417, 617 Ceramic Arts 3(0,9) Advanced applied studio work in ceramic sculpture and pottery. *Preq:* CAVA 317.

490, 690 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current developments in visual arts. *Preq:* Consent of department head.

850 Visual Arts Studio 3(0,9)

851 Visual Arts Studio 3-6(0,9)

870 Visual Arts Studio 6(1,15)

871 Visual Arts Studio 3-6(1,15)

880 Visual Arts Studio 3-15(1,15)

891 Master's Research 3-15(1,15)

ASTRONOMY (ASTR)

Professors: B. B. Bookmyer, J. R. Ray; *Associate Professor:* T. F. Collins; *Assistant Professor:* P. J. Flower

101 Solar System Astronomy 3(3,0) A descriptive survey of the universe, with emphasis on basic physical concepts and the objects in our solar system, is presented. Related topics of current interest will be included. For nonscience majors. This course may not be taken by a student who has completed ASTR 301.

102 Stellar Astronomy 3(3,0) A descriptive survey of the universe, with emphasis on basic physical concepts and galactic and extragalactic objects, is presented. Related topics of current interest will be included. For nonscience majors. This course may not be taken by a student who has completed ASTR 302.

103 Solar System Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 101. Demonstrations, laboratory exercises, planetarium visits, and a night laboratory, using a small telescope, will supplement the lecture course. *Coreq:* ASTR 101.

104 Stellar Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 102. Demonstrations, laboratory exercises, planetarium visits, and a night laboratory, using a small telescope, will supplement the lecture course. *Coreq:* ASTR 102.

301 General Astronomy 3(3,0) Basic physical concepts necessary to an understanding of the objects in our solar systems are presented. Films, planetarium visits, and one observing session with a small telescope supplement the text. For physical science, mathematical sciences, or engineering majors. This course may not be taken by a student who has completed ASTR 101. *Preq:* MTHSC 106.

302 General Astronomy 3(3,0) Basic physical concepts necessary to an understanding of our stellar system and the observable universe beyond our galaxy are discussed. Films, planetarium visits, and one observing session with a small telescope supplement the text. For physical science, mathematical sciences, or engineering majors. This course may not be taken by a student who has completed ASTR 102. *Preq:* MTHSC 106.

401, 601 Stellar Atmospheres 3(3,0) Introduction to the theory of stellar atmospheres. Topics to be discussed include radiation laws, theory of continuum radiation and spectral line formation, radiation transfer, and stellar spectra. Applications to the sun and stars will be presented. *Preq:* ASTR 302 or consent of instructor.

402, 602 Stellar Interiors and Evolution 3(3,0) Introduction to both the theoretical and observational approaches to the study of stellar evolution. The physical laws governing the temperature, pressure, and mass distributions in stars, including the equation of state, opacity and nuclear energy generation, will be described. Stellar evolution from pre-main sequence stars to post-red giant or supergiant stars will be studied. *Preq:* ASTR 302 or consent of instructor.

403, 603 Galactic Structure 3(3,0) Introduction to the kinematics, dynamics, and content of the Milky Way galaxy. Topics include galactic rotation and mass determination, galactic distance scale, stellar populations, galactic center, spiral structure, and evolution of the galaxy. *Preq:* ASTR 302 or consent of instructor.

410, 610 Cosmology 3(3,0) A study of the large-scale structure of the universe. Discussion of experimental results includes optical, microwave, and radio observations of galaxies and quasi-stellar objects. Evolutionary models that agree with current observations are discussed. *Preq:* ASTR 302 or consent of instructor.

412, 612 Practical Astronomy 3(3,0) Instruction in the techniques of data reduction and analysis, including discussions of instrumental and observational errors. Various methods of orbital solution will be applied to observations of visual, spectroscopic, and eclipsing binary systems. *Preq:* ASTR 302 or consent of instructor.

701 Solar System Astronomy for High School Teachers 3(3,0)

711 Stellar Astronomy for High School Teachers 3(3,0)

875 Seminar in Contemporary Astronomy 1-3(1-3,0)

BIOCHEMISTRY (BIOCH)

Professors: D. M. Henricks, G. L. Powell, J. M. Shively; *Associate Professors:* R. H. Hilderman, J. K. Zimmerman, *Acting Head; Assistant Professors:* C. S. Brown, E. S. Maxwell, G. R. Parr

101 Molecules and Man 1(1,0) An introduction to the structure and function(s) or effect(s) of some biological molecules important to man. *Preq:* Limited to freshmen or by consent of instructor.

102 Molecules and Man 1(1,0) Continuation of BIOCH 101. *Preq:* Limited to freshmen or by consent of instructor.

210 Elementary Biochemistry 4(3,3) A discussion of the kinds of compounds found in living organisms, their biochemical reactions and significance. The laboratory work parallels classroom study. *Preq:* CH 102 or 112.

301 General Biochemistry 3(3,0) An introduction to the nature, production, and replication of biological structure at the molecular level and its relation to function. *Preq:* Organic Chemistry.

302 Molecular Biology Laboratory 1(0,3) A laboratory to accompany BIOCH 301. An introduction to fundamental laboratory techniques in biochemistry and molecular biology and a demonstration of some of the fundamental principles of molecular biology discussed in BIOCH 301. *Preq:* Organic chemistry. *Coreq:* BIOCH 301.

304 Molecular Biology 3(3,0) An introductory course dealing with the principles of replication, transcription, and translation. Additional emphasis is placed on how these principles are organized within the cell. *Preq:* BIOL 110, CH 223. *Coreq:* CH 224 or consent of instructor.

406, 606 Physiological Chemistry 3(3,0) The chemical basis of the mammalian physiological processes of muscle contraction, nerve function, respiration, kidney function, and blood homeostasis is studied. Composition of specialized tissue such as muscle, nerve, blood and bone, and regulation of water, electrolytes and acid-base balance is discussed. *Preq:* BIOCH 210 or organic chemistry.

408, 608 Physiological Chemistry Laboratory 1(0,3) Experiments will be conducted that illustrate biochemical methodology. The use of radioisotopes, chromatography, and procedures used in the clinical biochemical laboratory will be emphasized. *Preq:* Registration in BIOCH 406.

422, 622 A Physical Approach to Biochemistry 3(3,0) The study of chemical and physical properties of amino acids, lipids, nucleic acids, sugars and their biopolymers. Physical and mathematical analyses will be correlated with biological structure and function. *Preq:* Organic chemistry and one semester of physical chemistry.

423, 623 Principles of Biochemistry 3(3,0) The study of the chemistry of amino acids, monosaccharides, fatty acids, purines, pyrimidines and associated compounds leads to an understanding of their properties and the relationship between structure and function that make them important in biological processes. The use of modern techniques is stressed. *Preq:* CH 224 or equivalent.

424, 624 Principles of Biochemistry 3(3,0) Continuation of BIOCH 423.

425, 625 General Biochemistry Laboratory 1(0,3) Experiments selected to illustrate current methods used in biochemical research.

426, 626 General Biochemistry Laboratory 1(0,3) Continuation of BIOCH 425.

491, H491 Special Problems in Biochemistry 1-8(0,3-24) Orientation in biochemical research; i.e., experimental planning, execution, and reporting. May be repeated for a maximum of 8 credits.

810 Advanced Biochemical Techniques 1-3(0,3-9)

815 Lipids and Biomembranes 3(3,0)

817 Chemistry and Metabolism of Hormones 3(3,0)

819 Regulation of Intermediary Metabolism 3(3,0)

820 Nucleic Acids and Protein Biosynthesis 3(3,0)

821 Proteins 3(3,0)

822 Enzymes (3,0)

824 Cellular Regulations at the Molecular Level 3(3,0)

825 Neurochemistry 3(3,0)

831 Physical Biochemistry 3(3,0)

851 Biochemistry Seminar 1(1,0)

871 Advanced Topics 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

BIOENGINEERING (BIOE)

Professors: D. W. Bradbury, F. W. Cooke, *Head;* A. F. von Recum, J. S. Wolf; *Associate Professors:* D. D. Moyle, F. R. Sias, Jr.; *Assistant Professors:* F. H. Bilge, W. R. Krause, E. M. O'Brien, D. L. Powers; *Adjunct Professors:* J. P. Boineau, L. S. Bowman, J. F. Dusenberry, T. S. Hargest, E. M. Lunceford, Jr., R. R. Moore, J. R. Pruitt, M. Spector, F. H. Stelling III; *Adjunct Associate Professor:* R. B. Schuessler

301 Engineering Aspects of Biology and Medicine 2(2,0) The relationships of various branches of engineering to biology and medicine. Structural engineering, fluid flow, and mass transfer in living systems. Artificial organs, biomaterials, implants, instrumentation, and other engineering challenges are discussed.

302 Biomaterials 2(2,0) Engineering testing and classification of biomaterials (stress, strain, viscosity, impact resistance, ductility, corrosion resistance, wear resistance); prostheses; artificial organs; effect of body environment on synthetic materials; methods for designing new materials. *Preq:* BIOE 301.

303 Artificial Organs 3(3,0) This course is designed to provide engineering and biological and physical science students with an insight into the problems associated with replacing parts of the human body with artificial devices. Lectures will be supplemented with demonstrations and medical films.

320 Introduction to Structural Biomechanics 2(2,0) Introduction to the analysis of the mechanical function of the human body and the effect of external forces on the body. Includes movement of the musculo-skeletal system (e.g., walking) and effect of vibration and impact. *Preq:* BIOE 301.

401, 601 Computers for Bioscientists 1(1,0) Analog and digital simulation of biochemical and biological processes. Systems approaches, dynamic analysis, interactions between laboratory research and computer models. *Preq:* One semester of calculus or consent of instructor.

402, 602 Medical Applications of Engineering 3(3,0) A survey of the applications of physical principles to health science. Topics included are production and detection of X-rays, diagnostic radiology and radiation therapy, nature of radioactive emissions, relative biological effectiveness, nuclear medicine, radiation protection, surgical uses of lasers, cryogenics, cryobiology and cryosurgery, ultrasound, electrosurgery. *Preq:* General chemistry.

415, 615 Dental Materials 2(2,0) An interdisciplinary course which reviews the biological and engineering aspects of dental materials. Topics: Properties and Structure of Materials (polymers, metals, alloys, ceramics, composites, degradation of materials in oral environment) and Applied Dental Materials (cement, amalgam, impression materials, gypsum compounds, waxes, gold and its alloys, base metal alloys, polymers applied in dentistry, recent advances in dental implant materials). *Preq:* CH 223 and PHYS 208.

450, 650 Special Topics in Biomedical Engineering 1-4(0-4,12-0) A comprehensive study of a topic of current interest in the field of biomedical engineering. May be taken for credit more than one time. *Preq:* Consent of instructor.

800 Seminar in Bioengineering 1(1,0)

801 Biomaterials 3(3,0)

802 Research Techniques in Biomaterials Evaluation 3(1,6)

803 Polymers as Biomaterials 3(3,0)

820 Structural Biomechanics 3(3,0)

823 Artificial Cardiac Assistance and Replacement 2(2,0)

847 Elements of Bioengineering 4(4,0)

850 Special Topics in Biomedical Engineering 1-4(0-4,12-0)

870 Bioinstrumentation 3(2,2)

882 Experimental Surgery 3(1,4)

890 Internship 1-5(0,8-40)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

BIOLOGY (BIOL)

Associate Professors: D. R. Helms, *Director;* R. A. Garcia, W. M. Surver, C. K. Wagner; *Assistant Professors:* S. B. Miller, M. V. Ruppert, D. J. Stroup; *Instructors:* S. Aneja, A. D. Smith; *Lecturer:* F. C. Armstrong

103 General Biology I 3(3,0)[1] The first course in a two-semester sequence on the fundamentals of biology. Emphasizes the structural, molecular, and energetic basis of cellular activities, fundamentals of genetic variability, and reproductive strategies of organisms. Diversity of animals and principles of evolution are introduced.

104 General Biology II 3(3,0)[1] Continuation of BIOL 103, emphasizing animals and plants as functional units, the evolution and diversity of plants, and the principles of evolution. *Preq:* BIOL 103.

105 General Biology Laboratory I 1(0,3)[1] Laboratory course that illustrates through experimentation, and/or demonstration the structure and activities of cells, genetics, and diversity of animals. This course is strongly recommended for students taking BIOL 103. *Coreq:* BIOL 103 or consent of instructor.

106 General Biology Laboratory II 1(0,3)[1] Laboratory course that illustrates through experimentation and/or demonstration the diversity of microbes, fungi, and plants. The structure and function of animals and plants, and the study of evolution and ecology are also emphasized. The course is strongly recommended for students taking BIOL 104. *Coreq:* BIOL 104 or consent of instructor.

110 Principles of Biology I 5(4,3)[1] An introductory course designed for students majoring in biological disciplines of the College of Sciences. The course integrates lecture and laboratory and emphasizes a modern, quantitative, and experimental approach to explanations of structure, composition, dynamics, interactions, and evolution of cells and organisms. High school chemistry is recommended. *Coreq:* CH 101.

111 Principles of Biology II 5(4,3)[1] Continuation of BIOL 110 that emphasizes the study of plants and animals as functional organisms and the principles of ecology. *Preq:* BIOL 110.

700 Classical Genetics 1

701 Microcomputer in the Biology Curriculum I 1

702 Ecology 1

703 Survey of the Kingdoms Monera, Protista, and Fungi 1

704 Analytical Thinking in Biology 1

705 Public Health Microbiology 1

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[1]Credit toward a degree will be given for only one sequence of the following: BIOL 110 or 103, 105, followed by BIOL 111 or 104, 106 dependent on the requirements for the major.

'06 Basic Methods of Preserving Vertebrates for Teaching Collections 1

'07 Preparation of Plants for Permanent Teaching Collections 1

'08 Food Microbiology 1

'31 Microcomputer in the Biology Curriculum II 1

'32 Microecosystems in the Classroom 1

'33 The Brain, Nervous System, and Sense Organs 1

'34 The Physiology of Respiration 1

'61 Microcomputer in the Biology Curriculum III 1

'62 Human Genetics 1

'63 Fundamental Immunology and Serology in Public Health 1

BOTANY (BOT)

Professors: R. P. Ashworth, N. D. Camper, C. R. Dillon, *Head; Associate Professors:* L. A. Dyck, J. E. Fairey III, T. M. McInnis, Jr; *Assistant Professors:* R. E. Ballard, K. M. Peterson

145 Environmental Dynamics 2(2,0) A nontechnical ecology course designed to aid in understanding the natural world and how it operates. Taught in the jargon of the mass media, it is designed for nonbiologists though biology students may find that it helps in assimilation of the major ecological concepts.

201 Field Botany 4(2,4) An introductory study of the taxonomy, ecology, and evolutionary processes of plants native to South Carolina. Emphasis is on field work which requires visits to many different habitats for observation and study of plant diversity. *Preq:* BIOL 104 and 106 or 111.

202 Survey of the Plant Kingdom 4(3,3) A survey of the major groups of plants, their structure, development, and reproduction. Evolutionary relationships as exemplified by comparisons of body organization and life cycles will be emphasized. *Preq:* BIOL 104/106 or 111 or BOT 205.

203 Humanistic Botany 2(2,0) A nontechnical course emphasizing plant species that have had an impact on human cultural development: history, economics, religion, comfort, and pleasure. *Preq:* BIOL 104/106 or 111 or BOT 205.

204 Mushrooms and Man 2(1,3) An introduction to the techniques of collecting, observing, and identifying mushrooms and other large, fleshy fungi and an exploration into the role of these fungi in human affairs. Mushroom cultivation, poisoning, and anthropological significance will be considered.

205 Plant Form and Function 4(3,3) Introductory course designed for students majoring in plant sciences of the College of Agricultural Sciences and the College of Forest and Recreation Resources. The course integrates lecture and laboratory and emphasizes fundamental structures and functions of higher plants. *Preq:* BIOL 103, 105, or consent of instructor.

221 Medical Botany 2(2,0)S A nontechnical course dealing with plant-originated drugs and substances used in modern treatment of physical and mental maladies of man will be studied along with plant products historically associated with folk medicine. Plants producing substances which are remedial, psychoactive, poisonous, carcinogenic, antibiotic, hallucinogenic, and others are included in this study. *Preq:* BIOL 104/106 or 111 or BOT 205.

254 Plant Structure 2(2,0) Consideration of the structure of seed plants, including external and internal organization of seeds, roots, stems, leaves, flowers, and fruits. Designed for students desiring a basic knowledge of plant organization; not open to Botany majors.

411, 611 Introductory Mycology 4(3,3) An introduction to the biology of all the groups of fungi and some related organisms, with considerations of the taxonomy, morphology, development, physiology and ecology of representative forms. Laboratory includes collection, identifications, and culture of native fungi. *Preq:* BIOL 104/106 or 111 or BOT 205.

413, 613 Phycology 4(3,3) Introduction to the biology of algae. Consideration is given to the structure, classification, evolution, natural history, physiology, and ecology of all algal groups. Labora-

tory includes experimentation, collection and identification of both freshwater and marine algae, and a field trip to the Florida Keys over the spring break. *Preq:* BIOL 104/106 or 111 or BOT 205.

421, H421, 621 Plant Physiology 4(3,3) The relations and processes which have to do with the maintenance, growth and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products and liberation of energy. *Preq:* CH 101, 102, PHYS 207 or 221 and 223.

431, H431, 631 Introductory Plant Taxonomy 4(3,3) Introduction to the basic principles and concepts of plant systematics with laboratory and field emphasis on the flora of South Carolina. *Preq.* BIOL 104/106 or 111 or BOT 205.

432, 632 Plant Geography 3(3,0) A descriptive study of the origin, distribution, and adaptations of plants and associations of plants as influenced by certain factors including climate, genetics, and cultural developments. Emphasis will be on the major floral provinces of North America. *Preq.* BIOL 104/106 or 111 or BOT 205.

435, 635 Evolution of Plant Species 3(3,0) Examination of species concepts and factors affecting the formation of species. *Preq:* BOT 431, GEN 302, or consent of instructor.

437, 637 Evolution of Angiosperms 3(3,0) A study of the origin, evolution, dispersal, morphological specialization, and geologic history of the angiosperm. *Preq:* BOT 431, 435 or consent of instructor

441, H441, 641 Plant Ecology 4(3,3) Detailed study of the effects of environmental factors upon plants and of the influence of plants upon the environment. Identification and analysis of interrelated biotic and physical factors which affect the structure, distribution, and dynamics of individual plants, plant populations, and ecosystems. *Preq:* BIOL 104/106 or 111 or BOT 205.

446, 646 Biological Oceanology 3(3,0) Introduction to the study of the oceans, their biological constituents and the physical and chemical characteristics of salt water. Other topics considered are the history of oceanography, currents, wind patterns, estuaries, shorelines, and ocean resources. *Preq:* BOT 202, CH 102 or 112 and ZOOL 201, or consent of instructor.

451, H451, 651 Plant Anatomy 4(3,3) Studies of the origin, development, and comparative structures of tissues, systems, and organs of higher plants. *Preq:* BIOL 104/106 or 111 or BOT 205.

455, 655 Vascular Plant Morphology 4(3,3) Consideration of the structure, reproduction, and phylogenetic relationships of representative vascular plants. *Preq:* BIOL 104/106 or 111 or BOT 205.

456, 656 Plant Microtechnique 2(0,6) Application of the principles of microtechnique involved in the fixing, cutting, and staining of plant tissues. *Preq:* BOT 451, 455, or consent of instructor.

461, 661 Cytology 3(3,0) Detailed consideration of the general and ultrastructural morphology of plant cells, cell division, and cell differentiation. A lecture course considering both the classical and contemporary knowledge of cell structure and development. *Preq:* BIOL 104/106 or 111 or BOT 205.

491 Special Problems in Botany 2-4(0,6-12) Research problems in selected areas of botany to provide an introduction to research planning and techniques for Botany majors. *Preq:* Senior standing and consent of the department head.

H492 Special Problems in Botany 1(0,3) Continuation of BOT 491. Research results from BOT 491 are written in a style appropriate for publication and presented in an open seminar. *Preq:* BOT 491

701 Evolutionary Botany for Teachers 3(2,3)

702 Modern Botanical Concepts for Teachers 3(3,0)

805 Special Problems in Botany. Credit to be arranged.

807 Seminar 1(1,0)

813 Special Topics in Mycology 2-4(0-2,0-6)

815 Phycology Colloquium 1-3(1-3,0)

821 Inorganic Plant Metabolism 4(3,3)

822 Organic Plant Metabolism 3(3,0)

823 Plant Growth and Development 3(3,0)

824 Mode of Action of Growth Substances 4(3,3)

831 Advanced Plant Taxonomy 3(2,3)

832 Special Topics in Plant Systematics 1-4(1-3,0-3)

841 The Biology of Aquatic Vascular Plants 3(2,3)

842 Physiological Plant Ecology 3(3,0)

843 Physiological Plant Ecology Laboratory 1(0,3)

845 Special Topics in Plant Ecology 1-4(1-3,0-3)

861 Plant Cell Biology 3(3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

CERAMIC ARTS (CRAR)

Professor: G. C. Robinson; *Associate Professor:* H. G. Lefort

101 Pottery Materials 3(2,3) The occurrence and properties of pottery raw materials. Attention is devoted to the occurrence of natural pottery materials in South Carolina and the methods and equipment used in preparing these materials.

102 Pottery Drying and Firing 3(3,0) The drying and firing process used in pottery making. A discussion is included on the design and construction of simple pottery kilns, and the student is required to build and operate a small outdoor kiln. The laboratory work demonstrates the drying and firing behavior of pottery.

CERAMIC ENGINEERING (CRE)

Professors: W. W. Coffeen, C. C. Fain, G. C. Robinson, *Head; Associate Professors:* H. G. Lefort, T. D. Taylor; *Assistant Professor:* E. C. Skaar

201 Introduction to Ceramic Engineering 2(2,0) An introduction to ceramic engineering together with a study of ceramic forming operations. Exercises are provided in the analysis of processing problems, the evaluation of background information and the creation of new solutions to processing problems.

202 Ceramic Materials 3(3,0) The properties and uses of commonly used ceramic materials. Equilibrium diagrams are used to gain an understanding of the effect of heat on the materials.

204 Laboratory Procedures 1(0,3) An introduction to ceramic laboratory procedures. Primary consideration will be given to the evaluation of sources of error and significance of measurement in the major ceramic test procedures.

302 Thermo-Chemical Ceramics 3(3,0) High-temperature equilibrium using the laws of physical chemistry as applied to ceramic systems in both solid and liquid states. An introduction to the crystal chemistry of ceramic raw materials, and the effect of crystalline form on their high-temperature behavior.

303 Materials Technology in Product Selection by Consumers 2(2,0) This course is intended to convey to the consumer a sufficient understanding of the properties of materials—metals, plastics, and ceramics—to enable the customer to make intelligent buying decisions. Property characteristics are related to cost and performance. Specific cases involving decisions are used to illustrate fundamental principles. Simple tests to determine material properties are suggested for consumer use.

304 Experiment Design 2(1,3) An exercise in the planning and organization of experiments in the ceramic field.

306 Fuels Combustion and Heat Transfer 1(0,3) Combustion devices, the calculation of combustion problems and heat transfer.

307 Thermal Processing of Ceramics 3(3,0) The accomplishment of changes in structure and composition through the application of thermal energy. The course includes a study of simultaneous transfer of heat and mass, fluid flow, determinants of rates in a variety of reactions and calculations of the energy requirements to accomplish change in structure or composition.

309 Research Methods 2(0,6) The planning and solution of selected research problems.

310 Introduction to Material Science 3(3,0) A beginning course in material science designed primarily for engineering students. The course is a study of the relation between the electrical, mechanical and thermal properties of products and the structure and composition of these products. All levels of structure are considered from gross structures easily visible to the eye through electronic structure of atoms.

402, 602 Solid State Ceramics 3(3,0) The effects of the composition, form, and shape of ceramic raw materials on the manufacturing processes and final properties of ceramic products. Included are fundamental studies of such phenomena as deflocculation, plasticity, sintering and the behavior of ceramic products in electrical circuits. *Preq:* Junior standing.

403, 603 Glasses 3(3,0) Glass structure and composition and their relation to the properties of glasses. Consideration is given to the processing variables which control the properties of glasses including glass products, enamels, glazes, and vitreous bonds.

404, 604 Ceramic Coatings 3(3,0) The raw materials, methods of manufacture, and properties of ceramic coatings. *Preq:* CRE 302.

406 Ceramic Project 2(0,6) The completion of an original research into a ceramic problem. *Preq:* CRE 302.

407 Plant Design 3(1,6) The application of the fundamentals of ceramic engineering to problems in plant design. *Preq:* Senior standing in Ceramic Engineering.

410, 610 Analytical Processes 3(2,3) An introductory course on the theory and use of X-ray diffraction and spectroscopic methods. *Preq:* Junior standing.

412, 612 Raw Material Preparation 3(3,0) The equipment and processes used in the crushing and grinding of raw materials, the separation and classification of particle sizes, and the separation and purification of minerals by mineral dressing methods.

416, 616 Electronic Ceramics 3(3,0) The theory and measurement of the electronic properties of ceramic products.

418, 618 Process Control 3(3,0) Process control techniques and apparatus with particular emphasis on temperature measurement and control systems. The application of laboratory techniques to the control of product quality and process efficiency is included. *Preq:* Junior standing.

419, H419, 619 Science of Engineering Materials 3(3,0) This course is planned to acquaint engineers with the thermal, electrical, and chemical characteristics of engineering materials. It emphasizes fundamental consideration of the structure of matter in the solid and glassy states, solid state reactions, and the influence of particle and aggregate structure to speed of reaction and product properties. The reasons for the properties of materials at elevated temperatures and room temperatures are related to these fundamentals.

420, 620 Science of Engineering Materials 3(3,0) Continuation of CRE 419 with emphasis on application of fundamentals in nuclear reactors and nuclear power plants. Consideration is given to the development of ceramics for fuel elements, moderator materials, control rods, shielding and radioactive waste disposal.

701 Special Problems 3(1-3,0)

807 Specialized Ceramics 3(3,0)

809 High-Temperature Materials 3(3,0)

814 Ceramic Physical Processing 3(3,0)

815 Colloidal and Surface Science 3(3,0)

816 Constitution and Structure of Glasses 3(3,0)

821 Analytical Procedures and Equipment I 3(2,3)

822 Analytical Procedures and Equipment II 3(2,3)

824 Mechanical Properties of Ceramic Materials 3(3,0)

825 Magnetic and Electrical Ceramic Material 3(3,0)

826 Ceramic Coatings 3(3,0)

828 Solid State Ceramic Science 3(3,0)

891 Master's Research. Credit to be arranged.

CHEMICAL ENGINEERING (CHE)

Professors: F. C. Alley, W. B. Barlage, Jr., *Head;* J. N. Beard, Jr., W. F. Beckwith, D. D. Edie, R. C. Harshman, S. S. Melsheimer, J. C. Mullins; *Associate Professor:* J. M. Haile; *Assistant Professors:* C. H. Gooding, R. W. Rice; *Lecturer:* G. B. Pullen; *Visiting Instructor:* E. R. Fieler

201 Introduction to Chemical Engineering 3(2,2) An introduction to the concepts of chemical engineering and a study of PVT relations for gases and vapors, material and energy balances, equilibria in chemical systems, and combined material and energy balances. *Preq:* CH 112, ENGR 180.

210 Process Modeling and Numerical Methods 3(3,0) This course will introduce students to some basic concepts of chemical process modeling and the use of numerical methods for solution of typical chemical engineering problems. Digital computational techniques for the numerical methods will use a specific procedure-oriented language such as Fortran. *Preq:* CHE 201, ENGR 180, MTHSC 206.

301 Unit Operations Theory I 3(3,0) The general principles of chemical engineering and a study of the following unit operations: Fluid Flow, Fluid Transportation, Heat Transmission and Evaporation. Special emphasis is placed on theory and its practical application to design. *Preq:* CHE 210, MTHSC 208.

302 Unit Operations Theory II 3(3,0) A study of selected unit operations based on diffusional phenomena. Primary attention will be given to differential contact operations such as absorption, humidification, and gas-liquid contact. *Preq:* CHE 301.

306 Unit Operations Laboratory I 2(1,3) Laboratory work in the unit operations of fluid flow, heat transfer, and evaporation. Stress is laid on the relation between theory and experimental results and on report writing. *Preq:* CHE 301.

331, H331 Chemical Engineering Thermodynamics I 3(3,0) A first basic course in static equilibria. Topics include the first and second laws of thermodynamics, real and ideal gases, thermodynamic properties of fluids, phase changes, and heats of reaction. *Preq:* CH 331, CHE 210, MTHSC 208.

353, 653 Process Dynamics 3(3,0) Basic process control and the effect of feedback in various systems. The mathematical analysis of the dynamic response of process systems to step and sinusoidal changes. Determination of the optimum settings for various combinations of proportional, reset and derivative control. *Preq:* Junior or Senior standing in engineering, physics, or chemistry, and MTHSC 425, or consent of department head.

401, H401, 601 Transport Phenomena 3(3,0) Mathematical analysis of single and multi-dimensional steady-state and transient problems in momentum, energy, and mass transfer. Both the similarities and differences in these mechanisms are stressed. *Preq:* CHE 302, MTHSC 425, or consent of instructor.

403 Unit Operations Theory III 3(3,0) Study of unit operations not covered in CHE 301 and 302. Includes liquid-liquid extraction, distillation, and other unit operations. *Preq:* CH 332, CHE 302, 331.

407 Unit Operations Laboratory II 3(1,6) Continuation of CHE 306 with experiments primarily on the diffusional operations. Additional lecture material on report writing and general techniques for experimental measurements and analysis of data. *Preq:* CH 332, CHE 302, 306.

415, 615 Introduction to Nuclear Engineering 3(3,0) Designed to acquaint the nonnuclear engineer with some of the engineering aspects of nuclear science. Topics include a brief survey of particle physics; nuclear reactions; energy transformations; nuclear reactors, their design, construction and use; radiation damage to materials of construction; and special problems in nuclear engineering peculiar to the basic engineering disciplines. *Preq:* Junior or Senior standing in engineering, chemistry, or physics.

421, 621 Process Development, Design, and Optimization of Chemical Engineering Systems I 3(2,3) A study of the steps in creating a chemical process design from the original concept to successful completion and operation of the plant. Topics include engineering economics, systems analysis, simulation, optimization, process equipment sizing and selection, and the application of analog and digital computers. *Preq:* CH 332, CHE 302, 331.

422, 622 Process Development, Design, and Optimization of Chemical Engineering Systems II 3(0,9) Continuation of CHE 421. The principles of process development, design, and optimization are applied in a comprehensive problem carried from a general statement of the problem to detailed design and economic evaluations. *Preq:* CHE 421, 430, 450.

424, 624 Introduction to Industrial Pollution 3(3,0) An introduction to air and water pollution problems associated with chemical processing, transportation and power generation. Basic processes and mechanisms utilized in the control of liquid and gaseous wastes are discussed from a standpoint of equipment design and economics. Present and future trends in pollution legislation are reviewed. *Preq:* Senior standing or consent of instructor.

426 Pulp and Paper Engineering 3(3,0) A study of the unit processes and of the design of the processing equipment used in the pulp and paper industry. *Preq:* CH 102 or 112.

430, 630 Chemical Engineering Thermodynamics II 3(3,0) Continuation of CHE 331. Subjects include heat engines, compressors, refrigeration, phase equilibria, and chemical reaction equilibria. *Preq:* CHE 331.

440 Senior Inspection Trip 0 A three- or four-day trip is made to visit selected chemical plants. Using lectures by plant personnel supplemented by conducted tours of chemical plant installations, the student is introduced to current industrial practice. *Preq:* Senior standing in Chemical Engineering.

450, 650 Chemical Engineering Kinetics 3(3,0) An introduction to the kinetics of chemical reactions. Topics include homogeneous and heterogeneous reactions, batch and flow reaction systems, catalysis, and design of industrial reactors. *Preq:* Completion of all 200- and 300-level courses in chemistry, chemical engineering, and mathematics.

491, H491 Special Projects in Chemical Engineering 1-3(1-3,0) As a need arises, special topics requested by students or offered by the faculty will be taught. Review of current research in an area, technological advances and national engineering goals are possible topic areas.

802 Process Dynamics and Control 3(3,0)

803 Heat, Mass, and Momentum Transfer 3(3,0)

804 Chemical Engineering Thermodynamics 3(3,0)

805 Chemical Engineering Kinetics 3(3,0)

812 Polymer Engineering 3(3,0)

814 Applied Numerical Methods in Process Simulation 3(3,0)

815 Polymer Engineering Laboratory 3(2,3)

818 Polymer Processing 3(3,0)

821 Heat Transport 3(3,0)

822 Mass Transfer and Differential Contact Operation 3(3,0)

823 Mass Transfer and Stagewise Contact Operation 3(3,0)

845 Selected Topics in Chemical Engineering 3(3,0)

846 Selected Topics in Chemical Engineering 3(3,0)

890 Special Projects 1-6(1-6,0)

891 Master's Research. Credit to be arranged.

904 Chemical Engineering Thermodynamics 3(3,0)

945 Selected Topics in Chemical Engineering 3(3,0)

946 Selected Topics in Chemical Engineering 3(3,0)

991 Doctoral Research. Credit to be arranged.

CHEMISTRY (CH)

Professors: R. A. Abramovitch, J. F. Allen, A. L. Beyerlein, M. B. Bishop, F. B. Brown, D. D. DesMarteau, *Head;* J. C. Fanning, J. W. Huffman, N. P. Marullo, A. R. Pinder, G. B. Savitsky, H. G. Spencer, J. L. von Rosenberg, Jr.; *Associate Professors:* R. H. Bailey, Jr., C. B. Bishop, J. F. Geldard, K. S. Landers, H. K. McDowell, J. D. Petersen, T. G. Tisue; *Assistant Professors:* D. W. Bennett, R. G. Delumyea, K. Dill, G. A. Mabbott; *Visiting Instructors:* R. L. Batson-Cunningham, A. A. Hawi, B. A. O'Brien

101 General Chemistry 4(3,3) Students are introduced to the elementary concepts of chemistry through classroom and laboratory experience. The course emphasizes chemical reactions and the use of symbolic representation, the mole concept and its applications and molecular structure.

102, H102 General Chemistry 4(3,3)[1] A continuation of CH 101, treating solutions, rates of reactions, chemical equilibrium, electrochemistry, chemistry of selected elements, and an introduction to organic chemistry. For students taking one year of chemistry or continuing in CH 201.

112 General Chemistry 4(3,3)[1] A continuation of CH 101 which emphasizes solutions, thermodynamic concepts, kinetics and oxidation-reduction reactions. The laboratory emphasizes solution chemistry and qualitative analyses. Recommended for students continuing in CH 223.

201 General Chemistry 4(3,3) A continuation of CH 102 which extends the introduction to organic chemistry and includes the chemistry of carbohydrates, lipids, and proteins and their role in metabolic processes. *Preq:* CH 102 or consent of instructor.

223 Organic Chemistry 3(3,0) An introductory course covering the principles of organic chemistry and the derivation of these principles from a study of the properties, preparations, and interrelationships of the important classes of organic compounds. *Preq:* CH 112 or consent of instructor.

224 Organic Chemistry 3(3,0) Continuation of CH 223. *Preq:* CH 223.

225 Organic Chemistry Laboratory 2(0,6) The laboratory techniques involved in the synthesis, separation and purification, and characterization of typical examples of the classes of organic compounds. *Preq:* Registration in CH 223.

226 Organic Chemistry Laboratory 2(0,6) Continuation of CH 225. *Preq:* Registration in CH 224.

227 Organic Chemistry Laboratory 1(0,3) The synthesis and properties of typical examples of the classes of organic compounds. *Preq:* Registration in CH 223.

228 Organic Chemistry Laboratory 1(0,3) Continuation of CH 227. *Preq:* Registration in CH 224.

229 Organic Chemistry Laboratory 1(0,3) A one-semester laboratory for chemical engineering students. *Preq:* CH 223.

313 Quantitative Analysis 3(3,0) The fundamental principles of volumetric, gravimetric and certain elementary instrumental chemical analyses. *Preq:* Organic chemistry.

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[1] Credit for a degree will be given for only one of the following: Ch 102 or 112.

315 Quantitative Analysis Laboratory 2(0,6) The laboratory techniques of volumetric, gravimetric, and elementary instrumental analysis.

317 Quantitative Analysis Laboratory 1(0,3) The standard techniques of analytical chemistry—gravimetric, volumetric, and instrumental.

330 Introduction to Physical Chemistry 3(3,0) A one-semester treatment of physical chemistry which emphasizes topics that are especially useful in the life sciences, agriculture and medicine, chemical thermodynamics, equilibrium, solutions, kinetics, electrochemistry, macromolecules, and surface phenomena. *Preq:* One semester of calculus.

331, 631 Physical Chemistry 3(3,0) Includes the gaseous state, thermodynamics, chemical equilibria, and atomic and molecular structure, from both experimental and theoretical points of view. *Preq:* MTHSC 206, physics.

332, H332, 632 Physical Chemistry 3(3,0) Continuation of CH 331, including chemical kinetics, liquid and solid state, phase equilibria, solutions, electrochemistry and surfaces.

339, 639 Physical Chemistry Laboratory 1(0,3) Experiments are selected to be of maximum value to Chemistry and Chemical Engineering majors. *Preq:* Registration in CH 331.

340, 640 Physical Chemistry Laboratory 1(0,3) Continuation of CH 339. *Preq:* Registration in CH 332.

402, H402, 602 Inorganic Chemistry 3(3,0) The basic principles of inorganic chemistry are discussed with special emphasis on atomic structure, chemical bonding, solid state, coordination chemistry, organometallic chemistry and acid-base theories. The chemistry of certain selected elements is treated. *Preq:* CH 331, 332.

411, 611 Instrumental Analysis 4(2,6) Demonstration and operation of modern optical and electronic precision-measuring devices as they apply to the processes of analytical, physical and organic chemistry. *Preq:* Physical chemistry.

421, H421, 621 Advanced Organic Chemistry 3(3,0) A survey of modern organic chemistry with an emphasis on synthesis and mechanisms. *Preq:* CH 224, 332, or equivalent.

427, 627 Organic Spectroscopy 3(2,3) A survey of modern spectroscopic techniques used in the determination of molecular structure. Emphasis is on the interpretation of spectra: nuclear magnetic resonance, ultraviolet, infrared, mass spectroscopy, optical rotatory dispersion and circular dichroism. *Preq:* One year each of organic chemistry and physical chemistry.

435, H435, 635 Spectroscopy and Molecular Structure 3(3,0) Molecular spectroscopy and structure as elucidated by elementary quantum mechanics. Topics covered include Planck's black-body radiation formulation leading to the quantum concept, solution of Schroedinger's equation for single systems, microwave spectroscopy, infrared and Raman spectroscopy, Fourier transformed spectra, electronic spectra and structure, and elementary statistical thermodynamics. *Preq:* CH 331, 332, MTHSC 208.

441 Glass Manipulation 2(0,6) A course designed to teach the fundamentals of glass manipulation and its application to the construction and repair of simple laboratory apparatus.

443 Research Problems 3(0,9) Original investigation of an assigned problem in a fundamental branch of chemistry. This work must be carried out under the supervision of a member of the staff. *Preq:* Senior standing in Chemistry or consent of instructor.

444 Research Problems 3(0,9) Continuation of CH 443.

454, H454, 654 Chemical Synthesis 3(1,6) This course is designed to introduce the student to modern research techniques in inorganic and organic chemistry. The experiments to be carried out involve the synthesis of various types of compounds by diverse experimental techniques. Modern instrumental methods will be used to characterize the products. *Preq:* Organic chemistry.

491, H491, 691 Introduction to Radiochemistry 3(2,3) A study of natural and synthetic isotopes, including atomic and nuclear structures, properties of radiation, tracer techniques and applications. The laboratory includes methods of detection and measurement of radiation, and applications of tracer techniques. *Preq:* Senior or graduate standing, consent of instructor.

700 Physical Science in Elementary School—Chemistry 3(2,3)
701 Review of General Chemistry 3(3,0)
702 Chemistry for High School Teachers 3(2,3)
703 Special Problems in Chemistry for Elementary and Secondary School Teachers 3-6(2-6,6-0)
804 Fundamental Principles of Inorganic Chemistry 3(3,0)
805 Theoretical Inorganic Chemistry 3(3,0)
806 Physical Methods in Inorganic Chemistry 3(3,0)
807 Chemistry of the Transition Elements 3(3,0)
808 Chemistry of the Nonmetallic Elements 3(3,0)
811 Analytical Chemistry 3(3,0)
812 Chemical Spectroscopic Methods 3(2,3)
814 Electroanalytical Chemistry 3(2,3)
821 Organic Chemistry I 3(3,0)
822 Organic Chemistry II 3(3,0)
824 Fundamental Principles of Polymer Chemistry 3(3,0)
825 Chemistry of Heterocyclic Compounds 3(3,0)
830 Fundamentals of Physical Chemistry 3(3,0)
831 Chemical Thermodynamics 3(3,0)
834 Statistical Thermodynamics 3(3,0)
835 Chemical Kinetics 3(3,0)
837 Quantum Chemistry 3(3,0)
840 Techniques of Experimental Chemistry 3(1,6)
851 Seminar 0-2
861 Principles of Biochemistry 3(3,0)
891 Master's Research. Credit to be arranged.
900 Advanced Topics in Inorganic Chemistry 1-4(1-4,0)
910 Special Topics in Analytical Chemistry 1-4(1-4,0)
920 Advanced Topics in Organic Chemistry 1-4(1-4,0)
930 Advanced Topics in Physical Chemistry 1-4(1-4,0)
950 Microanalytical Techniques 3(1,6)
991 Doctoral Research. Credit to be arranged.

CIVIL ENGINEERING (CE)

Professors: S. C. Anand, B. L. Atchley, R. H. Brown, H. W. Busching, J. E. Clark, *Acting Head;* B. L. Edge, J. C. McCormac, A. E. Schwartz, P. B. Zielinski; *Associate Professors:* W. Baron, R. E. Elling, J. L. Josey, S. Nnaji, R. F. Nowack, B. L. Sill, P. R. Sparks, D. B. Stafford; *Assistant Professors:* J. L. Burati, C. H. Juang; *Visiting Assistant Professor:* J. E. Fowler

201 Surveying 3(2,3) Elementary plane surveying for civil engineering and other students whose curriculum requires a basic knowledge of surveying. Coverage includes measurement of distance, angles and elevations, stadia, topography, area and volume calculations, construction surveying. Field exercises provide practice in the use of surveying instruments. *Preq:* MTHSC 106.

205 Civil Engineering Computer Applications 3(2,2) Review of basic FORTRAN programming followed by discussion of more advanced programming. Practical problems include use of plotting devices and computer graphics. Problem-oriented languages are studied. *Preq:* ENGR 180.

301 Structural Analysis I 3(2,2) Analysis of statically determinate structural elements and systems. Influence lines for beams and trusses. Calculation of rotations and deflections by moment area,

conjugate beam and unit load methods. Moment distribution and introduction to other methods of indeterminate analysis. *Preq:* EM 304.

302 Structural Steel Design 3(2,2) Design of steel tension members, beams, columns, beam columns and connections by working stress method. Introduction to plastic analysis and design. Emphasis on AISC specification. *Preq:* CE 301.

310 Transportation Engineering 4(3,2) Planning, location, design, operation, and administration of highways, railroads, airports and other transportation facilities, including economic considerations, pavement design, and digital computer applications to geometric and earthwork computation. *Preq:* CE 201.

320 Introduction to Construction Materials 3(2,3) Basic properties of portland cement and bituminous asphalt. Classification of aggregates on the basis of strength and size distribution. Mix design procedures, field control, and adjustments. Properties of fresh mixes and hardened concrete. Behavior of other construction materials including metals, composites, and plastics. Field trips to nearby plants. *Preq:* EM 305.

324 Introduction to Construction Engineering 3(3,0) A survey of the principal methods and equipment used in the construction industry. Critical path methods, construction equipment, and construction management practices are included. *Preq:* Junior standing.

330 Soil Mechanics 3(2,2) Mechanical and physical properties of soils and their relation to soil action in problems of engineering, such as classification, permeability, shearing strength, consolidation, stress distribution and bearing capacity of soils. *Preq:* EM 304 and Junior standing.

402 Reinforced Concrete Design 3(2,2) Analysis and design of reinforced concrete beams, columns, footings, and one-way slabs using the strength design method. Includes a brief introduction to the analysis and design of beams with the working stress method. *Preq:* CE 301.

403, 603 Use of Computers in Structural Analysis and Design 3(2,2) Analysis and design of structures such as bridges, buildings, and towers using modern computer techniques; emphasis placed on use of available computer programs. *Preq:* CE 301, 302, 402, or consent of instructor.

404, 604 Masonry Structural Design 3(3,0) Fundamentals of masonry materials, construction, structural systems. Application of structural design principles to multistory structures. Lateral load resisting shear walls, loadbearing walls, columns and pilasters, connections. *Preq:* CE 402.

405, 605 Structural Systems Design 3(2,3) Study of physical properties and mechanical response of engineered structural systems. Analytical and approximate methods of structural analysis will be used to generate comparative structural performance data. Class and laboratory assignments will use structural models and value engineering to help with quantitative evaluation of structural forms. *Preq:* CE 302, enrollment in CE 402.

410, 610 Traffic Engineering: Operations 3(3,0) Basic characteristics of motor-vehicle traffic; techniques for making traffic engineering investigations; design and applications of traffic control devices; traffic design of parking facilities; traffic laws and ordinances; public relations. *Preq:* CE 310.

412, 612 Urban Transportation Planning 3(3,0)F Urban travel characteristics; characteristics of transportation systems; transportation and land-use studies; trip distribution and trip assignment models; city patterns and subdivision layout. *Preq:* CE 310.

417, 617 Airphoto Interpretation I 3(2,3) A brief review of the basic geometry of aerial photographs, characteristics of geologic and topographic features identifiable from aerial photographs, and site characteristics related to soil profile. Laboratory work includes soil mapping, selection of construction sites, and location of soil deposits for engineering purposes. *Preq:* Junior standing.

419, 619 General Photogrammetry 3(2,3)S Fundamentals of mapping using aerial photographs; characteristics, production and use of aerial photographs; study of the operation of popular photogrammetric instruments including aerial cameras, stereoscopic viewing and plotting equipment; use of stereocomparagraph and multiplex plotting instruments; scale, tilt, and coordinate calculations; construction of photomosaics. *Preq:* MTHSC 108 and Junior standing.

421, 621 Hydrology 3(3,0) Introduction of elements of surface water and groundwater hydrology. Application of hydrologic and hydraulic principles to the solution of problems concerning water supply, flood control, water quality, and related topics in water resources. *Preq:* EM 320.

425 Engineering Relations 3(3,0) Business, legal, and ethical relations in engineering practice. *Preq:* Senior standing.

431, 631 Applied Soil Mechanics 3(2,2) Relationship of local geology to soil formations, groundwater, planning of site investigation, sampling procedures, laboratory determinations of design parameter, foundation design, and settlement analysis. *Preq:* CE 330.

432, 632 Construction Project Administration 3(2,3) Development of organizational structure that will execute the construction, cost control, and coordinating functions for the project. Information systems developed to serve the job and to close the gaps between the owner, home office, field office, subcontractors, and labor. *Preq:* CE 324 or equivalent.

433, 633 Construction Planning and Scheduling 3(2,3) Principles and applications of the Critical Path Method (CPM) and Project Evaluation and Review Techniques (PERT). Project breakdown and network graphics. Identification of the critical path and resulting floats. Definition and allocation of materials, equipment, and manpower resources. Resource leveling, compression, and other network adjustments. Computer applications using ICES-Project and other packaged routines. *Preq:* CE 324 or equivalent.

434, 634 Construction Estimating and Project Control 3(2,3) Specifications, contracts, and bidding strategies. Purchasing and subcontracting policies. Accounting for materials, supplies, subcontracts, and labor. Procedural details for estimating earthwork, reinforced concrete, steel, and masonry. Overhead and profit items. *Preq:* CE 433 or equivalent.

435, 635 Engineering Project Analysis 3(2,2) Advanced analysis of engineering projects. Theory of economic, financial and intangible analysis of large-scale construction projects. Practical exercises in cost-benefit studies and construction decisions. *Preq:* Consent of instructor.

438, 638 Construction Support Operations 3(2,3) Description of activities necessary for the completion of a construction job although not specifically recognized as direct-construction activities. General conditions, safety, security, quality assurance, value engineering. Organizational support features and typical implementation procedures. *Preq:* CE 324 or equivalent.

439, 639 Construction Equipment Selection and Maintenance 3(2,3) Methodology of selecting the right equipment of the right size for each task of the construction job on the basis of power-train characteristics, crew size, terrain conditions, and job requirements. Cycle time, costs, specifications, maintenance, replacement policy, monitoring. *Preq:* CE 324 or equivalent.

441, 641 Applied Hydraulics 3(3,0) The course is intended to present advanced concepts of hydraulics within a framework of relevant engineering problems. Topics included are flow in closed conduits, flow in open channels, hydraulic structures, flow measurements, fluid machinery, sediment transport, unsteady flow. *Preq:* EM 320.

453, 653 Advanced Structural Analysis 3(3,0) Analysis of statically indeterminate structures, including continuous beams, trusses and frames by virtual work, Castigliano's theorems, three-moment equation, moment distribution, and slope deflection. Influence lines for statically indeterminate structures. Muller-Breslau principle. Approximate methods for indeterminate frames. Introduction to computerized structural analysis. *Preq:* CE 301.

462, 662 Coastal Engineering I 3(3,0) Introduction to coastal engineering principles, including wind wave generation and propagation, linear wave theory, and coastal processes. Indepth consideration is given to coastal structures, including groins, jetties, bulkheads, seawalls, and other structures used for shore protection and port development. Small craft harbors and design are also presented. *Preq:* EM 320.

463, 663 Coastal Engineering II 3(3,0) Advanced concepts in coastal engineering including nonlinear wave mechanics, littoral transport, long-period waves, and shoaling in estuaries. The

emphasis of the course is on wind waves and sedimentation, the two major problems faced in coastal engineering. *Preq:* CE 462 and EM 320 or consent of instructor.

464, 664 Physical Models in Fluid Mechanics 3(2,2) Classical techniques of dimensional analysis and similitude are presented for fluid mechanics problems with actual construction of an operating physical model to solve a practical engineering problem. Problem will be chosen from the areas of coastal engineering, waste heat disposal, water quality, and river mechanics. Experimental design and instrumentation will be covered in detail. *Preq:* EM 320.

470, 670 Probabilistic Design in Civil Engineering 3(3,0) Review of traditional civil engineering design methodology; identify uncertainties, construct probability models of random design parameters; incorporate uncertainty into the design and planning of selected civil engineering systems. *Preq:* Senior standing in engineering or consent of instructor.

490, H490, 690 Special Projects 1-3(1-3,0) Studies or laboratory investigations on special topic in civil engineering field which are of interest to individual students and staff members. Arranged on a project basis with a maximum of individual student effort and a minimum of staff guidance. *Preq:* Senior standing.

801 Matrix Methods of Structural Analysis 3(3,0)

802 Prestressed Concrete Analysis and Design 3(3,0)

803 Reinforced Concrete Structural Systems 3(3,0)

804 Theory and Design of Thin Plates 3(3,0)

805 Plastic Analysis and Design of Steel Structures 3(3,0)

806 Metal Compression Members 3(3,0)

807 Numerical and Approximate Methods of Structural Analysis 3(3,0)

808 Finite Element Method in Engineering 3(3,0)

811 Highway Geometric Design 3(2,3)

812 Airphoto Interpretation II 3(2,3)

813 Highway and Airport Pavement Design 3(3,0)

814 Traffic Flow Theory 3(3,0)

815 Transportation Safety Engineering 3(3,0)

816 Highway Planning 3(3,0)

817 Mass Transit Planning 3(3,0)

818 Airport Planning and Design 3(3,0)

819 Transportation Research 2-4

822 Aggregates and Concretes for Construction 3(3,0)

830 Advanced Soil Mechanics 3(3,0)

831 Foundation Engineering 3(2,3)

835 Construction Project Modeling and Control 3(2,3)

837 Construction Specifications and Contracts 3(2,3)

840 Construction of Nuclear Power Plants 3(2,3)

846 Flow in Open Channels 3(3,0)

860 Advanced Fluid Mechanics 3(2,2)

861 Mechanics of Sediment Transport 3(2,2)

862 Heat Transfer at Water Surfaces 3(3,0)

865 Hydrologic Systems Analysis 3(3,0)

866 Advanced Hydrologic Systems Analysis 3(3,0)

871 Coastal Hydrodynamics 3(3,0)

872 Marine Pollution Control 2(2,0)

889 Special Problems I 1-3

890 Special Problems II 1-3

891 Master's Research. Credit to be arranged.

893 Selected Topics in Civil Engineering 1-6(1-6,1-6)

901 Theory and Design of Shell Structures 3(3,0)

902 Dynamic Analysis of Structures 3(3,0)

991 Doctoral Research. Credit to be arranged.

COACHING EDUCATION (CED)

Instructors: S. L. Colson, S. W. Schalles

341 Scientific Basis and Kinesiological Foundations of Coaching 3(2,3) Course designed to help the student increase understanding of basic scientific information concerning athletic movement by utilizing the conceptual approach. It also will deal with the study of basic scientific principles of physiology and how they can be applied to conditioning programs for the athlete.

342 Foundations of Athletics 3(2,3) Study of modern techniques and practices used in the organizational procedure of athletic programs. Major problem areas such as practice and game organization, purchase and care of equipment, budget and finances, public relations legal liability, drug abuse, and sports psychology.

442 Practicum in Coaching 3(1,6) Directed supervision in coaching.

COMMUNITY AND RURAL DEVELOPMENT (CRD)

(See courses listed under Agricultural Economics and Rural Sociology)

Professors: B. L. Dillman, M. S. Henry, J. C. Hite, E. L. McLean, B. H. Robinson, *Head; Associate Professor:* T. A. Lyson

357 Natural Resources Economics 3(3,0)F The principles and problems involved in the use of soil, water, forest, and mineral resources, with special emphasis on economic aspects of alternative methods of resource utilization. *Preq:* AGEC 202; ECON 200 or 211.

411, 611 (AGEC) Regional Impact Analysis 2(2,0) Techniques for analysis of the growth and decline of regions including economic-base theory, shift share, regional input-output, regional econometric models, and fixed impact models. *Preq:* AGEC 202 or ECON 211 and 212.

412, 612 (AGEC) Spatial Competition and Rural Development 2(2,0) Development of rural activity in the context of historical, theoretical, and policy aspects of friction associated with spatial separation. Location factors, transfer costs, location patterns, and regional-growth policy are considered. *Preq:* AGEC 202 or ECON 212.

491 (AGEC) Internship, Agribusiness, and Community and Rural Development 1-6(0,2-12) Internship under faculty supervision in an approved agency or firm. An internship is designed to provide students with work experience in agribusiness or community and rural development. Student will submit a comprehensive report within one week of the end of the internship. A maximum of 6 internship credits may be earned. *Preq:* Junior standing and/or consent of instructor.

COMPARATIVE LITERATURE (CMLT)

403 Modern Studies 3(3,0) Comparative studies in modern literature. *Preq:* Two years study of a foreign language and six credits in literature.

COMPUTER ENGINEERING

(See Electrical and Computer Engineering)

COMPUTER SCIENCE (CPSC)

Professors: S. T. Hedetniemi, J. C. Peck; *Associate Professors:* S. M. Hedetniemi, E. W. Page III, A. J. Turner, Jr., *Head;* J. M. Westall, Jr.; *Assistant Professors:* K. R. Allen, H. C.

Grossman, A. W. Madison, R. P. Pargas, H. A. Pellerin; *Instructor:* E. O. Hare; *Lecturers:* J. A. Bate, A. C. Connor, C. W. Foreman, K. B. Pruitt, H. C. Sellers, P. D. Snoddy, D. E. Stevenson; *Visiting Associate Professor:* C. E. Kirkwood, Jr.; *Visiting Assistant Professor:* E. H. Brownlee, Jr.; *Visiting Lecturer:* D. R. Connor

110 Elementary Computer Programming 3(3,0) Introduction to computer programming and its use in solving problems, intended primarily for technical majors. The Fortran programming language will be used.

120 Introduction to Information Processing Systems 3(3,0) Introduction to the techniques, principles and concepts of modern information processing systems, intended primarily for nontechnical majors. Topics include information processing packages and application, usage of typical information processing packages, digital computers, programming fundamentals and languages, and implementation of computer programs.

130 Data Processing with Cobol 3(3,0) Introduction to data processing techniques and applications. Emphasis is placed on the organization and processing of data files. The Cobol programming language is used. *Preq:* CPSC 110 or 120, or equivalent.

150 Introductory Fortran Programming 2(2,0) Introduction to computer programming in the Fortran language.

151 Introductory PL/I Programming 2(2,0) Introduction to computer programming in the PL/I language. *Preq:* Knowledge of a computer programming language.

152 Introductory Pascal Programming 2(2,0) Introduction to computer programming in the Pascal language. *Preq:* Knowledge of a computer programming language.

154 Introductory Snobol Programming 1(1,0) Introduction to computer programming in the Snobol language. *Preq:* Knowledge of a computer programming language.

155 Introductory RPG Programming 1(1,0) Introduction to computer programming in the RPG language. *Preq:* Knowledge of a computer programming language.

156 Introductory Basic Programming 1(1,0) Introduction to computer programming in the Basic language. *Preq:* Knowledge of a computer programming language.

210 Programming Methodology 3(3,0) Introduction to programming techniques and methodology. Topics include structured programming, top-down design, stepwise refinement, modularization criteria, program testing, and techniques for large programs. *Preq:* CPSC 110, 130, or 150, or equivalent.

230 Assembly Language Programming 3(3,0) Introduction to computer organization, machine language, and assembly language programming. The organization, machine language and assembly language of the IBM 370 will be studied. *Preq:* CPSC 110 or 210, or equivalent.

250 Advanced Fortran Programming 2(2,0) A continuing study of programming and problem solving using the Fortran language. Topics such as the use of data files and plotting will be included. *Preq:* CPSC 110, 120, or 150; or equivalent.

251 Advanced PL/I Programming 2(2,0) A study of the advanced features of the PL/I language. Topics such as file processing, dynamic storage allocation and compile-time facilities will be included. *Preq:* CPSC 151 or equivalent.

253 APL Programming 1(1,0) Introduction to computer programming in the APL language. *Preq:* CPSC 210 or consent of instructor.

330 Computer Systems Organization 3(3,0) An introduction to the structure and programming of computer systems. Various hardware/software configurations are explored and are presented as integrated systems. Topics include basic computer organization, input/output organizations, interrupt processing and system software. *Preq:* CPSC 230 or consent of instructor.

340 Introduction to Data Structures 3(3,0) Basic concepts of data structures such as queues, stacks, and lists. This course includes the study of algorithms for the manipulation of data structures, the implementation of these algorithms in existing programming languages, and applica-

tions such as storage allocation and garbage collection. *Preq:* CPSC 210. *Coreq:* CPSC 230 or equivalent.

360 Peripherals and File Design 3(3,0) A study of peripheral devices and data management as a basis for the design of information systems. Traditional data processing applications will be presented and evaluated in terms of efficiency and effectiveness. Problems using standard file organization and access techniques will be assigned. *Preq:* CPSC 130.

422, H422, 622 Systems Programming 3(3,0) A treatment of computer operating system facilities, with special attention being given to the local system. Topics include assembly language macros, job control language, data management, linkage editors, utilities and debugging techniques. *Preq:* CPSC 230.

423, 623 Introduction to Operating Systems 3(3,0) A detailed study of the management techniques for the control of computer hardware resources. Topics include interrupt systems, primitive level characteristics of hardware and the management of memory, processor, devices, and data. Specific reference is made to the IBM 370. *Preq:* CPSC 422.

428, 628 Design and Implementation of Programming Languages 3(3,0) An overview of programming language structures and features and their implementation. Control and data structures found in various languages will be studied. Runtime organization and environment and implementation models will also be included. *Preq:* CPSC 230 and 340 or equivalent.

429, 629 Translation of Programming Languages 3(3,0) Techniques and considerations for compiling and interpreting programming languages. Topics include scanning, parsing, optimization, code generation and their theoretical foundations. The implementation of a compiler or a major component of a compiler normally will be a term project. *Preq:* CPSC 422, 428.

430, 630 Computer Performance Evaluation 3(3,0) Computer hardware and software measurement and evaluation in selection and improvement. Topics include measurement tools, analytic and simulation models, workload models, and program performance. *Preq:* CPSC 423 or E&CE 429, and MTHSC 301; or equivalent.

435, 635 Microprogramming 3(3,0) Software development at the microprogram level. Topics include organization of microprogrammed computers, emulation, interpreter design, and high-level language support. A survey of microprogrammable machines is also included. *Preq:* CPSC 422 and E&CE 429 or consent of instructor.

450, 650 Theory of Computation 3(3,0) An introduction to models of computation and machine description languages, including finite-state automata and regular expressions, pushdown automata and context-free languages, and Turing machines and recursive functions. Topics include equivalence and relative computing power of the models studied, enumeration, Church's thesis, and undecidability problems. *Preq:* E&CE 352 or MTHSC 219 or consent of instructor.

462, 662 Teleprocessing and Database Management Systems 3(3,0) An introduction to database/data communications concepts as related to the design of online information systems. Problems involving structuring, creating, maintaining and accessing multiple-user data bases will be presented and solutions developed. Comparison of several commercially available teleprocessing monitor and database management systems will be made. *Preq:* CPSC 360.

463, 663 Online Systems 3(3,0) This course provides an indepth study of the design and implementation of transaction processing systems and an introduction to basic communications concepts. A survey of commercially available software and a project using one of the systems are included. *Preq:* CPSC 462.

471, 671 Systems Analysis 3(3,0) This course incorporates a study of the decision-making process at all levels with the logical design of information systems. Extensive study of the system life cycle with emphasis on current as well as classical techniques for describing data flows, data structures, file designs, etc. *Preq:* CPSC 360.

472, 672 Software Development Methodology 3(3,0) Advanced topics in software development methodology. Techniques such as chief programmer teams, structured design and structured

walk-throughs will be discussed and used in a major project. The emphasis of this course is on the application of these techniques to large-scale software implementation projects. Additional topics such as mathematical foundations of structured programming and verification techniques will also be included. *Preq:* CPSC 340, 360.

480, 680 Fundamentals of Computer Science 3(3,0) A study of fundamental concepts of computers and programming, intended primarily for Computer Science graduate students without an undergraduate degree in Computer Science. Topics include machine organization, assembly language programming, programming systems, and data management. May not be taken by those who have completed CPSC 230. *Preq:* Expertise in programming in a high-level language and consent of instructor.

481, 681 Special Topics in Computer Science 1-3(1-3,0) Areas of computer science in which nonstandard problems arise. Innovative approaches to problem solution which draw from a variety of support courses will be developed and implemented. Emphasis will be placed on independent study and projects. *Preq:* Consent of instructor.

823 Operating Systems Design 3(3,0)

825 Software Systems for Data Communications 3(3,0)

828 Theory of Programming Languages 3(3,0)

840 Design and Analysis of Algorithms 3(3,0)

862 Database Management System Design 3(3,0)

864 Computer Architecture 3(3,0)

881 Special Topics 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

DAIRY SCIENCE (DYSC)

Professors: J. F. Dickey, R. W. Henningson, J. H. Martin, *Head;* G. D. O'Dell; *Associate Professors:* J. A. Collins, B. F. Jenny; *Assistant Professors:* A. B. Bodine II, D. E. Harmon; *Instructor:* M. E. Richardson

101 Dairy Foods 1(1,0)F, S Dairy foods such as ice cream, yogurt, and various cheeses; the use of these foods for nutrition and pleasure. Sampling of various products will take place throughout the course.

102 Mammalian Reproduction 1(1,0)F, S Physiology and endocrinology of the reproductive processes in male and female mammals with emphasis on farm animals. Control of reproductive cycles, diseases, sexuality, and effects of drugs on reproduction will be discussed.

201 Introduction to Dairy Science 3(2,3)F The basic principles of dairy production and manufacturing. The laboratory is designed to demonstrate the basics of breeding, feeding, and management of dairy cattle, quality control of milk, and the processing of milk and dairy products.

304 Evaluation of Dairy Products 2(1,3)S Emphasis placed on sensory evaluation of dairy products. Discussion of basic principles of organoleptic evaluation, fundamental rules for scoring and grading dairy products. Evaluation of all classes of dairy products, based on established grades and score cards. *Preq:* Consent of instructor.

307, H307, 607 Market Milk 3(2,3)F Composition, procurement, processing, distribution, quality control, public health aspects, basic chemistry and bacteriology of industrial milk supplies and related products. *Preq:* Consent of instructor.

310 Dairy Cattle Selection 2(1,3)S Emphasis is placed upon the selection of dairy cattle for profitable herd operations. Evaluations of herd classification, fitting, showing, and true type are made.

400, 600 Cultured Dairy Products 3(2,3)S Basic principles of microbiological culture propagation, types of lactic cultures, their properties and uses, as well as processing procedures, quality control, and compositional and organoleptic characteristics of cultured dairy products will be discussed.

The laboratory phase will include inplant experience with culture propagation and product manufacture. *Preq:* MICRO 305 or consent of instructor.

401 Special Problems 1-2(0,3-6) Problems of special interest to the senior student. The course is designed to give experience with and independent study of selected dairy problems not covered in depth in other courses. *Preq:* Consent of instructor.

402, 602 Dairy Manufacturers 3(2,3)F The principles and practice of the manufacture of ice cream and related dairy products; the principles of the manufacture of condensed and evaporated milks and milk powders; and the physical, chemical, and biological factors involved. *Preq:* Consent of instructor.

403, 603 Laboratory Techniques 3(2,3)F Research and quality control techniques commonly used in dairy science and related agri-sciences. *Preq:* CH 101, 102, or consent of instructor.

404, 604 Plant Management 3(2,3)S Even-numbered years. The organization and operation of dairy and food plants and the coordination of all functions into an orderly business enterprise. Emphasis will be given to management's responsibility concerning the procurement, processing, quality control and distribution of food products. Business and industrial techniques are used to develop maximum efficiencies.

409 Dairy Science Seminar 2(2,0)F Odd-numbered years. Special research problems in production and manufactures are studied. Individual topics not fully covered in classwork are assigned for special report before class and members of Dairy Science staff.

452, 652 Dairy Cattle Feeding and Management 3(2,3)S Odd-numbered years. Fundamental principles in the care, feeding, and management of dairy cattle of all ages. Topics include general consideration in selecting a breed and the individual cow, calf raising, growth and development of dairy heifers, care and management of the milking herd and feeding for milk production.

453, H453, 653 Animal Reproduction 3(3,0)F, S Reproductive physiology and endocrinology of mammals with emphasis on farm animals and frequent reference to reproduction in laboratory animals and humans. *Preq:* Consent of instructor.

455, 655 Reproductive Management 1(0,3)F Application of management techniques such as artificial insemination, pregnancy detection, and computer recordkeeping for achieving a high level of reproductive efficiency in cattle. *Preq:* To be taken concurrently or to follow DYSC 453.

456, 656 Animal Reproductive Management 1(0,3)S Physiology and endocrinology of the pregnant cow is discussed. Emphasis is placed on achieving proficiency in pregnancy detection techniques. *Preq:* DYSC 455 or consent of instructor.

461, 661 Physiology of Lactation 3(3,0)F Anatomy and development of the mammary gland; physiological and biochemical regulation of mammary growth and milk secretion with emphasis on farm animals and reference to other mammals. *Preq:* BIOCH 210, CH 223, or consent of instructor.

490 Practicum 1-4 Supervised dairy science learning opportunity, providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written report midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. *Preq:* Sophomore standing and consent of instructor.

801 Topical Problems 1-3

803 Physiology of Reproduction and Milk Sectretion 3(3,0)

808 Industrial Dairy Science 3(3,0)

820 Dairy Science Graduate Seminar 1(1,0)

891 Master's Research. Credit to be arranged.

ECONOMICS (ECON)

Professors: R. C. Amacher, R. L. Cottle, *Head;* R. D. Elliott, H. H. Macaulay, Jr., R. B. McKenzie, R. D. Shannon, B. R. Skelton, G. R. Thompson, W. D. Trevillian, H. H. Ulbrich,

W. C. Whitten, Jr.; *Associate Professors:* D. W. Blair, R. E. McCormick, M. T. Maloney, M. S. Wallace, J. T. Warner; *Assistant Professors:* D. C. Bowles, R. M. Kirk, G. A. Uhimchuck, L. F. Wang; *Instructor:* D. L. Placone; *Visiting Assistant Professors:* W. F. Chappell, C. R. Ersenkal, R. C. Leonhard

101 Economics in Our Times 1(1,0) A nontechnical introduction to economics based on an examination of current issues and problems for students who have not taken ECON 200, 211, or 212. Does not count toward the requirements of the major or minor in Economics.

200 Economic Concepts 3(3,0) A comprehensive course including both micro- and macroeconomic concepts for the student not having theoretical course requirement beyond the principles level or for the student expecting to take a selected group of the 300-level courses in economics.

203 Consumer Economics 2(2,0) A presentation of information and material to facilitate consumer decision making in such areas as home finance, insurance, banking, investments, taxation, budgeting and other areas of immediate concern to the American consumer.

211, H211 Principles of Economics 3(3,0) An intensive study of the economics of the firm, pricing of resources, and international economic relations. Theory is given relevance through the analysis of current economic problems.

212, H212 Principles of Economics 3(3,0) The fundamental principles of pricing, stabilization, and growth in a modern economy. Topics include supply and demand, employment theory and fiscal policy, banking system and monetary policy, and economics of growth.

301 Economics of Labor 3(3,0) The economics of the labor market, the problems of the industrial worker, and the methods of adjusting labor-management disputes. *Preq:* ECON 200 or 211, 212.

302, H302 Money and Banking 3(3,0) Considers the function of money and banking in both the product and financial markets. Special emphasis is placed on monetary theory and current problems of monetary policy. *Preq:* ECON 200 or 211, 212, and consent of instructor.

304 (FIN) Risk and Insurance 3(3,0) See FIN 304.

305 (FIN) Investment Analysis 3(3,0) See FIN 305.

308 Collective Bargaining 3(3,0) The practices, procedures, legal foundations, and legal structure associated with collective bargaining. The form and content of the labor contract, the grievance machinery, and the mediation and arbitration institutions will also be studied. *Preq:* ECON 200 or 211.

309 Government and Business 3(3,0) The relationships between government and business, including among other topics, governmental efforts to enforce competition; to regulate public utilities; and to protect the special interests of laborers, farmers, and consumers. *Preq:* ECON 200 or 211.

311, 611 (MASC) Introduction to Econometrics 3(3,0) Elements of time series analysis and introduction to the measurement, specification, estimation and interpretation of functional relationships through single equation least square techniques. Problems of multicollinearity, dummy variables, heteroscedasticity, autocorrelation, and lagged variables in simple economic models are introduced. *Preq:* ECON 314, MTHSC 301.

314, H314 Intermediate Economic Theory 3(3,0) An analytical study of the basic concepts of value and distribution under alternative market conditions. *Preq:* ECON 200 or 211, 212, and consent of instructor.

403, 603 Development of Economic Thought 3(3,0) A study of the origin and evolution of economic ideas with some emphasis on the historical context, the problems which inspired these ideas, and the nature of the solutions which they provided from ancient days to the present. *Preq:* ECON 200 or 211, 212.

404, 604 Comparative Economic Systems 3(3,0) A comparative analytical and historical study of the principal economic systems which have been important in the modern world including among others, capitalism and socialism. *Preq:* ECON 200, 211, 212.

407, H407, 607 National Income and Employment Analysis 3(3,0) Macroeconomic problems of inflation and unemployment form the focal points. Statistics (GNP and the Consumer Price Index) and theory (Classical, Keynesian, and Monetarist views) will be included. Pertinent public policies designed to deal with these problems will be analyzed. *Preq:* ECON 200 or 211.

408, 608 Arbitration 3(3,0) Analysis of dispute settlement procedures with specific emphasis on mediation, factfinding, and arbitration as they are used to resolve labor-management disputes in the public and private sectors. *Preq:* Consent of instructor.

409, 609 (MGT) Managerial Economics 3(3,0) Use of tools of economic analysis in classifying problems, in organizing and evaluating information, and in comparing alternative courses of action. Bridges the gap between economic theory and managerial practices. *Preq:* MASC 310 or ECON (MASC) 311, or consent of instructor.

410, 610 Economic Development 3(3,0) Consideration and analysis of economic and related problems of the underdeveloped countries. Attention will be given to national and international programs designed to accelerate solution of these problems. *Preq:* ECON 200 or 211, 212.

412, H412, 612 International Trade and Finance 3(3,0) Analysis of the principles governing trade between nations. Topics include trade theory, comparative advantage, theory and practice of commercial policy, balance of payments, determination of exchange rates, interaction of foreign and domestic sectors, price and income effects of trade, multinational corporations, and economic integration. *Preq:* ECON 314 or consent of instructor.

419, 619 Economics of Defense 3(3,0) Examines the American defense establishment in terms of resources utilized, alternative uses, and the contribution to the national economy and scientific progress generated by resources in a defense use. Discussed are economic problems inherent in shifting resources between defense and nondefense uses and among alternative defense uses. *Preq:* ACCT 200 or 201, ECON 200 or 211.

420, H420, 620 Public Sector Economics 3(3,0) Study of the role of government and its proper functions and limitations in a market. Provision of goods and services by all levels of government and instruments of taxation are evaluated according to efficiency and equity criteria. Contemporary public sector issues are emphasized throughout. *Preq:* ECON 314 or consent of instructor.

421, 621 Urban Economics 3(3,0) Economic problems associated with the concentration of population in central places are examined. Economic reasons for the development of cities are studied and models of urban location and growth are analyzed. A major emphasis of the course is on the identification and evaluation of alternative solutions to urban economic problems. *Preq:* ECON 200 or 211, 212.

422, H422, 622 Monetary Theory and Policy 3(3,0) An intensive study of the role of monetary factors in economic change. Modern monetary theories and their empirical relevance for policy are developed against a background of monetary history and institutions. *Preq:* ECON 302 or consent of instructor.

424, H424, 624 The Organization of Industries 3(3,0) Empirical, historical, and theoretical analyses of market structure and concentration in American industry: the effects of oligopoly, monopoly, and cartelization upon price, output and other policies of the firm; antitrust and other public policies and problems will be studied. *Preq:* ECON 314 or consent of instructor.

430 Mathematical Economics 3(3,0) Traditional economic theories are derived using elementary mathematics. Major emphasis is placed upon microtheoretical models. Specialized topics such as cartel theory, national income analysis, price discrimination, and optimization theory over time will be economically analyzed, using mathematical tools. *Preq:* ECON 314, MTHSC 106.

499 Senior Seminar in Economics 1-3(1-3,0) Current economic issues, research, and community service activities will provide the subject matter for the semester. Students may participate in the analysis of issues, development of research, and other activities requiring the use of skills acquired in their undergraduate programs.

750 Economic Concepts and Classroom Applications for Teachers 3(3,0)

751 Current Issues in Economics for Teachers 3(3,0)

801 Microeconomic Theory 3(3,0)

802 Advanced Economic Concepts and Applications 3(3,0)

805 Macroeconomic Theory 3(3,0)

807 (MASC) Econometric Methods I 3(3,0)

808 (MASC) Econometric Methods II 3(3,0)

809 Mathematical Economics 3(3,0)

812 History of Economic Thought 3(3,0)

816 Labor Economics 3(3,0)

817 Public Employee Labor Relations 3(3,0)

820 Public Sector Economics 3(3,0)

825 Economics of Environmental Quality 3(3,0)

831 Seminar in Urban Development Economics 3(3,0)

840 International Trade Theory 3(3,0)

850 Monetary Theory 3(3,0)

888 Directed Reading in Economics 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

900 Seminar in Advanced Economic Theory 3(3,0)

EDUCATION (ED)

Professors: I. C. Briscoe, W. O. Corder, C. R. Freeze, E. B. Galloway, G. W. Gray, E. J. Kozma, *Head;* H. F. Landrith, J. E. Matthews, E. F. Olive, R. K. Peden, W. W. Pennscott; *Associate Professors:* A. D. Brooks, S. L. Buckner, J. V. Hamby, L. B. Hart, R. E. Jenkins, D. F. Keller, O. R. Lumpkin, T. H. Parry, F. C. Raetsch, J. C. Richardson, B. L. Sandberg, J. H. Walker, M. C. Woodson, Jr.; *Assistant Professors:* J. H. Adair, M. S. Crosby, A. M. Derr, R. P. Green, Jr., B. M. Raetsch, V. B. Stanley; *Visiting Instructor:* C. E. Moore

100 Orientation 1(1,0) Lectures and discussions on teaching in addition to serving as teacher aides. Required of all students in Early Childhood Education, Elementary Education, Secondary Education, and Science Teaching.

101 Reading Improvement 1(0,3) Provides an individualized approach to developmental reading skills emphasizing comprehension, vocabulary, and rate.

102 Efficient Reading 1(0,3) Extends the reading skills of vocabulary, comprehension, and rate stressing skimming, scanning, flexibility, and critical reading.

103 Study Techniques 1(0,3) Aims at individual study skills in the content areas and makes application by using these techniques in college curricula. Priority given to freshmen.

301, H301 Principles of American Education 3(3,0) A study of the legal basis, historical development, characteristics, and functions of educational institutions in the United States.

302, H302 Educational Psychology 3(3,0) The nature, capacities, equipment, growth, and development of the learner.

321 Physical Education for Elementary School: Games and Sports Skills 3(2,3) Values, purposes, and uses of creative games and games of low organization. Basic skills and lead-up activities for children. Methods of instruction and time allotments appropriate for elementary school programs. *Preq:* Junior standing Education major or consent of instructor.

334, H334 Child Development 3(3,0) A study of the physical and emotional growth and development of the child.

335, H335 Adolescent Growth and Development 3(3,0) The physical and emotional growth and development of the adolescent.

336 Behavior of the Preschool Child 3(2,3) A study of behavior of the preschool child, including observation and participation. *Preq:* ED 302 or PSYCH 201.

406, 606 History and Philosophy of Education 3(3,0) An analysis of the development of modern education practices and philosophies with emphasis upon the historical and philosophical development in the United States.

412 Directed Teaching in Secondary School Subjects 12(1,33) A program of supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for prospective teachers to obtain experiences in the subject area. Students to be sectioned according to teaching fields: English, history, social sciences, mathematical sciences, modern languages, science. Enrollment is limited.

424 Methods and Materials in Secondary School Instruction 3(3,0) Development of instructional practices and materials appropriate for the secondary school; familiarization with curriculum materials. Students to be sectioned according to teaching area: English, history, social science, mathematical sciences, modern language, science.

429, 629 Teacher As Manager 3(3,0) Course designed to help teachers, principals, and other school personnel solve school problems by identifying and applying selected management techniques, and to better prepare educators for the added responsibilities demanded of them by the movement to measurable improvement in their management of learning.

431, 631 Special Institute Course: Early Childhood Education 1-3(1-3,0) Subject areas organized according to Institute needs.

432, 632 Special Institute Course: Elementary School 1-3(1-3,0) Subject areas organized according to Institute needs.

433, 633 Special Institute Course: Secondary School 1-3(1-3,0) Subject areas organized according to Institute needs.

434, 634 Special Institute Course: Current Problems in Education 1-3(1-3,0) Subject areas organized according to Institute needs.

435, 635 Special Institute Course: Curriculum 1-3(1-3,0) Subject areas organized according to Institute needs.

436, 636 Special Institute Course: Supervision and Administration 1-3(1-3,0) Subject areas organized according to Institute needs.

458 Health Education 3(3,0) A study of the information needed for effective cooperation with parents, physicians and public health agenices in the promotion and improvement of community health, including problems of personal hygiene, health records, immunization, and control of communicable disease.

459 Fundamental Skills for Reading Instruction 3(2,2) Study of language development, preschool and primary reading process, historical development of reading, and basic skills. Laboratory field experiences to be arranged with each individual.

461, H461 Teaching Reading in the Elementary School 3(2,3) Study of the various phases of reading and their relation to the elementary program. Emphasis on modern practices in the classroom teaching of reading. Includes observation and participation in the elementary classroom. *Preq:* For student teachers or consent of instructor.

462 Diagnostic and Corrective Reading 3(2,3) The purpose of this course is to prepare the prospective classroom teacher for diagnosing and correcting reading problems. Laboratory field experiences will be arranged for each individual. *Preq:* Three semester hours in reading or consent of instructor.

466 Introduction to Early Childhood Education 3(3,0) Introductory course for Early Childhood Education, which includes an overview of curriculum for kindergarten and primary grades.

469, 669 Characteristics of Children with Emotional Handicaps 3(3,0) Intensive study of the meaning and concepts associated with emotionally handicapped. Analysis of the causes and

characteristics of emotionally handicapped. *Preq:* ED 302, or PSYCH 201 and ED 471, or consent of instructor.

470, 670 Characteristics of Children with Learning Disabilities 3(3,0) The nature and extent of perceptual, motor, and conceptual impairments are examined. Team functions, community role, and family needs are emphasized. *Preq:* ED 302, ED 471 and PSYCH 201, or consent of instructor.

471, 671 The Exceptional Child 3(3,0) Survey of exceptionality including handicapped and gifted children; nature, cause, and treatment of difficulties; educational problems.

472, 672 Psychology of Mental Retardation 3(3,0) Psychological aspects of mental retardation: learning, motivation, and personality development.

473, 673 Teaching the Mentally Retarded 3(3,0) Study, selection, and preparation of curricular materials; methods of teaching retarded children within the preadolescent and adolescent range. *Preq:* ED 472 or equivalent.

474, 674 Educational Procedures for Children with Emotional Handicaps 3(3,0) Major problems of teaching disturbed children: curriculum and instructional modifications, program planning, facility adaptation, behavior controls, articulation with mental health specialists, and procedures to develop readiness for return to regular class. *Preq:* ED 302, ED 471 and PSYCH 201, or consent of instructor.

475, 675 Educational Procedures for Children with Learning Disabilities 3(3,0) Special emphasis is given to educational evaluation and remedial procedures designed to improve the individual's learning abilities. A multisensory approach is emphasized geared to individual need. *Preq:* ED 302, ED 471 and PSYCH 201, or consent of instructor.

476, 676 Practicum in Learning Disabilities 3(2,3) Designed to provide practical experience in teaching the learning disabilities under the supervision of College faculty and local teachers of learning disabilities. *Preq:* ED 470, 471, 475, or consent of instructor.

477, 677 Characteristics of Children Who Are Gifted 3(3,0) This course is designed to acquaint the student with definitions, incidences, characteristics, identification procedures, and curriculum options for the gifted. *Preq:* ED 471.

478, 678 Practicum in Emotionally Handicapped 3(2,3) Designed to provide practical experience in teaching the emotionally disturbed under the supervision of College faculty and local teachers of emotionally handicapped. *Preq:* ED 469, 471, 474, or consent of instructor.

479, 679 Practicum in Mentally Retarded 3(2,3) Designed to provide practical experience in teaching the mentally retarded under the supervision of College faculty and local teachers of mentally retarded. *Preq:* ED 471, 472, 473, or consent of instructor.

481 Directed Teaching in the Elementary School 12(1,33) Supervised observation and teaching experiences in cooperation with selected elementary schools. Enrollment is limited to seniors or graduates who have completed prerequisite courses. *Preq:* Senior standing, 2.0 grade-point ratio, and consent of area coordinator.

483 Methods and Materials for Early Childhood Education 3(2,3) Study of methods and materials applicable to nursery schools, kindergarten, and early elementary grades. Includes observation and participation in preschool and/or primary grades.

484 Directed Teaching in Early Childhood Education 12(1,33) Supervised observation and teaching experiences in cooperation with nursery, kindergartens, and early elementary schools. Enrollment is limited to seniors or graduates who have completed prerequisite courses and who have the accumulated grade-point ratio for graduation. *Preq:* Senior standing, 2.0 grade-point ratio, and consent of area coordinator.

485 Methods and Curriculum in Elementary Mathematics and Science 3(2,3) Develop understandings, skills, and attitudes in the elementary mathematics and science curricula, with emphasis on strategies, techniques, and materials for teaching elementary mathematics and science. Includes observation and participation in the elementary classroom.

487 Teaching Social Studies in the Elementary School 2(1,3) Provides the preservice teacher with an introduction to the skills of the social studies and the methods, materials, and techniques needed to teach these skills to students in the elementary school. Includes observation and participation in the elementary classroom. *Preq:* Junior standing Education major.

488 Teaching the Language Arts in the Elementary School 3(2,3) Provides the preservice teacher with an introduction to the skills of the language arts other than reading and the methods, materials, and techniques needed to teach these skills to students in the elementary school. Includes observation and participation in the elementary classroom. *Preq:* Junior standing Education major.

497, 697 Audio-Visual Aids in Education 3(3,0) The techniques and uses of audio-visual aids in improving teaching effectiveness.

498, H498 Secondary Content Area Reading 3(1,4) Designed for preservice teachers who are involved with field experiences prior to student teaching full time. The course is designed to prepare content area teachers to teach the reading skills necessary for effective teaching of content area material. *Preq:* For students enrolled in professional block semester.

705 Principles of Guidance 3(3,0)

707 Reading and Independent Study in Education 1-3

720 School Personnel Administration 3(3,0)

721 Legal Phases of School Administration 3(3,0)

722 Field Experiences in School Administration 3(2,3)

740 Curriculum Planning for Early Childhood Education 3(3,0)

741 Introduction to Pupil Personnel Services in Higher Education 3(3,0)

742 Psychology of Post Secondary School Youth 3(3,0)

759 Fundamentals of Basic Reading 3(3,0)

760 Curriculum Development in the Elementary School 3(3,0)

761 Reading Instruction in the Elementary School 3(3,0)

762 Reading Diagnosis and Remediation 3(2,3)

763 Middle School Reading 3(3,0)

764 The Role of the Library in the Reading Program 3(3,0)

765 Secondary School Curriculum 3(3,0)

794 School and Community Relationships 3(3,0)

798 Teaching Secondary School Reading 3(3,0)

801 Seminar in Human Growth and Development 3(3,0)

802 Human Development: Psychology of Learning 3(3,0)

803 Advanced Methods of Teaching in the Secondary School 3(3,0)

804 Advanced Methods of Teaching in the Elementary School 3(3,0)

805 The Two-Year College 3(3,0)

808 Educational Tests and Measurements 3(3,0)

809 Analysis of the Individual 3(3,0)

810 Theories and Techniques of Counseling 3(3,0)

811 School Finance 3(3,0)

812 The Counselor as Consultant 3(2,2)

813 Educational and Vocational Informational Service and Placement 3(3,0)

814 Field Experiences in Elementary School Guidance 3(2,3)

815 Field Experiences in Secondary School Guidance 3(2,3)

816 Field Experiences in Personnel Services in Higher Education 3(2,3)

817 Development of Counseling Skills 3(3,0)

818 Field Problems in School Administration and Supervision of Instruction 3(2,3)

819 Psychoeducational Evaluation Internship 3(0,6)

820 Teaching Language Arts to the Exceptional Child 3(3,0)

821 Assessment of the Exceptional Child 3(3,0)

822 Teaching Mathematics to the Exceptional Child 3(3,0)

823 Mainstreaming the Handicapped 3(3,0)

830 Techniques of Supervision—the Public Schools 3(3,0)

834 Educational Evaluation 3(3,0)

840 Program Development and Implementation in Early Childhood Education 3(2,2)

850 Public School Administration 3(3,0)

853 Administration and Supervision of Special Education 3(3,0)

856 Introduction to School Building Planning 3(2,2)

857 Selected Topics in Educational Administration 1-3(1-3,0)

861 Organization and Supervision of Reading Programs 3(3,0)

862 Clinical Research in Reading 3(3,0)

863 Practicum in Reading 3(2,2)

864 Special Problems in Reading Education 1-3(1-3,0-4)

865 Advanced Diagnosis and Remediation in Reading 3(2,3)

866 The Psychology of Teaching Reading 3(3,0)

867 Advanced Practicum in Reading 3(2,3)

871 Interpersonal and Group Relationships 3(3,0)

881 Individual Testing 3(3,0)

ELECTRICAL AND COMPUTER ENGINEERING (E&CE)

Professors: A. W. Bennett, *Head;* T. L. Drake, A. L. Duke, D. J. Dumin, L. T. Fitch, R. W. Gilchrist, B. E. Gilliland, J. N. Gowdy, J. W. Lathrop, J. F. Leathrum, J. T. Long, J. C. Martin, J. D. Spragins, M. L. Wolla; *Associate Professors:* E. G. Baxa, Jr., J. E. Bennett, J. K. Bryan, T. E. Burke, J. N. Daigle, J. J. Komo, H. V. Poe, F. R. Sias, Jr., R. W. Snelsire; *Assistant Professors:* C. J. Alajajian, M. A. Bridgwood, D. R. Cochran, E. M. O'Brien, M. A. Wortman; *Visiting Professor:* J. N. Thurston; *Visiting Instructor:* W. J. Park, Jr.

201 Logic and Computing Devices 3(1,4) A study of logic with an introduction to Boolean algebra. Number systems and representation of information. The use of integrated circuits to implement combinational and sequential logic functions and computing elements. The organization and structure of computing systems.

202, H202 Electric Circuits I 3(3,0) DC resistive circuits, Kirchhoff's laws, nodal and mesh emphasis, independent sources, Thevenin's and Norton's theorems, RC, RL, RCL circuit solutions with initial condition using homogenous or nonhomogenous ordinary differential equations having constant coefficients. Develop sinusoidal steady state solution. *Preq:* PHYS 221. *Coreq:* E&CE 203, MTHSC 208.

203 Electrical Circuits Laboratory I 1(0,2) A laboratory course designed to accompany E&CE 202. Introduction to basic electrical circuits and instrumentation. *Coreq:* E&CE 202.

250 Principles of Digital Computer Systems 3(2,2) Introduction to minicomputers and microcomputers. Topics include machine organization and operation, information flow within a machine, data types and structures, data transfers and communication with external devices, computer response time, interrelation between software and hardware, memory types, specifying cost-

effective small computer systems, application examples, introductory assembly language programming. *Preq:* ENGR 180 or an introductory programming course. *Coreq:* E&CE 201.

299 Digital Computation 2(1,2) A programming course emphasizing engineering applications. Familiarity with the fundamentals of Fortran programming is assumed. *Preq:* Elementary knowledge of Fortran.

301, H301 Electric Circuits II 2(2,0) Continuation of the study of electric circuits, including three-phase circuits, complex frequency and network functions, frequency response, two-port parameters, and magnetically-coupled circuits. *Preq:* E&CE 202. *Coreq:* E&CE 303.

302 Linear Control Systems 3(3,0) An introduction to linear control systems. Topics include plant representation, applications of state variables, time and frequency response, stability, system specification, and system design. *Preq:* E&CE 301, 330, and EM 202 or 211.

303 Electrical Circuits Laboratory II 1(0,2) A laboratory course designed to accompany E&CE 301. Characteristics of circuits. *Coreq:* E&CE 301.

307 Basic Electrical Engineering 2(2,0) A first course in electrical engineering to provide non-Electrical Engineering majors with a knowledge of electric circuit theory, both dc and ac. The last five weeks of the semester are devoted to an introduction to digital systems. *Preq:* MTHSC 206, PHYS 221. *Coreq:* E&CE 309.

308 Electronics and Electromechanics 2(2,0) Continuation of E&CE 307. Energy conversion systems are considered, as well as basic electronics, plus instrumentation with emphasis on digital methods. *Preq:* E&CE 307. *Coreq:* E&CE 310.

309 Electrical Engineering Laboratory I 1(0,2) A laboratory designed to accompany E&CE 307. Basic electrical circuits and instrumentation. *Coreq:* E&CE 307.

310 Electrical Engineering Laboratory II 1(0,2) A laboratory designed to accompany E&CE 308. Basic electronics and energy conversion. *Coreq:* E&CE 308.

317 Electrical Systems Analysis 3(3,0) Introduction to engineering problems of a probabilistic nature. Problems will be solved which utilize the concepts of probability space and functions of random variables. *Preq:* E&CE 330.

320 Electronics I 2(2,0) Introduction to p-n junction theory and the concepts of solid-state devices. Development of the electrical characteristics of diodes and transistors. Operational characteristics of simple digital circuits and monolithic integrated circuits. *Preq:* E&CE 202, MTHSC 208, PHYS 221. *Coreq:* E&CE 325.

321, H321 Electronics II 2(2,0) Operation of bipolar and field effect amplifying circuits at both high and low frequencies. *Preq:* E&CE 320. *Coreq:* E&CE 326.

322 Electronics for Computer Engineers 3(3,0) Device models, logic circuits and integrated devices with particular emphasis on digital applications, small signal amplifiers. Applications of digital and linear integrated circuits. Credit not given to students who have taken E&CE 320 and 321. *Preq:* E&CE 202, 301 or 307, 308.

325 Electronics Laboratory I 1(0,2) Laboratory designed to accompany E&CE 320. Characteristics and performance of current electronic devices. *Coreq:* E&CE 320.

326 Electronics Laboratory II 1(0,2) Laboratory designed to accompany E&CE 321. Characteristics of different amplifier configurations. *Coreq:* E&CE 321.

330, H330 Electrical Systems Analysis 3(3,0)F, S Nonsinusoidal periodic waves. Circuit analysis using trigonometric and exponential forms of Fourier. Extension to nonperiodic waves. Frequency spectra. Laplace transformation and the complex-frequency variable. Analysis using Laplace transforms. Pole-zero techniques. Introduction to z-transforms, flow graph, Bode plots and state variables. *Preq:* E&CE 202, MTHSC 208. *Coreq:* E&CE 301.

340 (PHYS) Electric and Magnetic Fields I 2(2,0) Introduction to classical electromagnetics. Topics include vector analysis. Coulomb's law, electric field intensity, Gauss's law, potential theory, and solution of Laplace's equation. *Preq:* MTHSC 208, PHYS 221.

341, H341 (PHYS) Electric and Magnetic Fields II 2(2,0)F, S Continuation of E&CE (PHYS) 340 to include magnetic circuits and devices and forces in magnetic fields, time-varying fields, Maxwell's equations, and transmission lines. *Preq:* E&CE (PHYS)340.

350 Mini-Micro Computer Programming 3(2,2) An indepth study of software design and implementation as applicable to mini- and micro-computers. Topics include assembly language programming; use of editors, loaders, monitors, etc.; data structure fundamentals and software design methodologies. *Preq:* E&CE 250.

351 Real-Time Application of Digital Computers 3(2,2)S Application and operation of digital computers in a real-time or time-critical environment. Topics include interrupt facilities, analog-to-digital and digital-to-analog signal conversion, digital computer interfaces, on-line acquisition and reduction of data. Software concepts include multitask real-time executives, schedulers, and dynamic resource allocation systems. *Preq:* E&CE 350.

352 Machines, Languages, and Algorithms 3(3,0)S Topics fall into three major areas: discrete structures, formal languages, and finite state models. Emphasis is placed on relating formalisms to practical considerations such as logical design of digital machines and the limitations of machine computation. *Preq:* Junior standing in engineering or the physical sciences, or consent of instructor.

402 Engineering Projects 1(0,2) Knowledge and skills needed by electrical engineers to function as a project leader or team member in an industrial environment. Topics considered include project proposals, planning, operation, and reports. Case studies and role-playing methods of instruction are used. *Preq:* Senior standing in Electrical and Computer Engineering or consent of instructor.

403, 603 Energy Conversion 3(3,0)F Various methods of energy conversion with emphasis on solar energy which includes conversion techniques, storage, applications, systems, and future trends. Other energy conversion methods including fuel cells, magnetohydrodynamics, and nuclear are covered. *Preq:* MTHSC 208, PHYS 222.

404, 604 Semiconductor Devices 3(3,0) Consideration of the principles of operation, the external characteristics, and the applications of some of the more important semiconductor devices presently available. *Preq:* Introductory electronics course.

405, H405 Special Problems 1-3 F, S Electrical engineering problems assigned to the student according to his needs and capabilities. The purpose is to give students a chance to do projects, either theoretical or experimental, on subjects not covered in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of problem supervisor.

410, H410, 610 Introduction to Digital Control Systems 3(3,0) Introductory course in digital control theory with microprocessors and minicomputers applications: z-transforms, flow graphs, state variables, stability, system compensation using state variables, root locus, Nyquist's and Routh's criterion, optimal design. Introduction to minicomputer and microcomputer implementation of control algorithms. Computer I/O techniques for control applications, time-response limitations of transfer functions. *Preq:* E&CE 302. *Coreq:* E&CE 451.

411, 611 Electrical Systems 1(0,2) Experimental investigations in the areas of mathematical modeling, transient and steady-state reponses of second and higher order systems, Bode plots, Nyquist's plots, modulation, system identification, and Pade's rational function approximations. *Coreq:* E&CE 302, 422.

412 Electrical Machines Laboratory 1(0,2) Selected experiments which will help the student become familiar with characteristics of transformers, dc and ac motors and generators. Measurement techniques and component modeling will be included. *Coreq* or *Preq:* E&CE 421.

417, 617 Software Design 3(3,0) An indepth study of methodologies and techniques used throughout the software development cycle including analysis, design, implementation, and testing. Additional topics include software development tools and software project management techniques. *Preq:* CPSC 110, E&CE 299 or ENGR 180; E&CE 250.

420, H420, 620 Power Systems Analysis I 3(3,0) A study of electric power system terminology, components, and operation. Subjects covered include power, reactive power, and power factor; three-

phase systems; transmission lines; per unit representation; transformers; synchronous machines; introduction to load flow; economic dispatch, fault analysis, and stability. *Preq:* E&CE 301, E&CE (PHYS) 340.

421, H421, 621 Electrical Machinery 3(3,0) Characteristics of dc and ac machines are studied with emphasis on steady state and nonlinear operation. Coverage includes transformers; dc, induction, and synchronous motors; and alternators. *Preq:* E&CE 301.

422, H422, 622 Electronics III 3(3,0) Characteristics of oscillators and operational amplifiers. The use of electronic circuits as building blocks in analog and digital systems. Characteristics of semiconductor power devices and power circuits. *Preq:* E&CE 301, 321.

424, 624 Power Systems Analysis II 3(3,0) Continuation of E&CE 420. Topics introduced in E&CE 420 are covered in more detail and depth. Subjects covered are load and flow studies, optimum operating strategies, fault analysis, transient stability, and the control problem. System modeling and computer solution of power system problems are included. *Preq:* E&CE 420.

425, 625 Microcomputers I 3(2,2) Survey of currently available microprocessors, indepth study of the architecture of more prominent microprocessors, hardware and software design, use of microcomputer-development system, design projects. *Preq:* CPSC 230 or E&CE 250.

426, 626 Digial Computer Design 3(3,0)S Design of high-speed ALU's, control and timing circuitry, memory systems, I/O circuitry. Microprogrammed computer design using bit-slice microprocessors. Current hardware topics related to computer design. Hands-on design experience. Use of logic analyzer for system debugging. *Preq:* CPSC 230 or E&CE 250.

427, 627 Operational Amplifiers 3(2,2)S The fundamentals, design and applications of the operational amplifier. *Preq:* E&CE 321 or equivalent.

428, 628 Analog Communications 3(3,0) A course in modern analog communications theory. Topics covered are Fourier transforms with emphasis on spectral translations, power spectra, correlation, signals in linear systems, stochastic signals, amplitude modulation, frequency modulation, sampling, and analog forms of pulse transmission. *Preq:* E&CE 317.

429, 629 Computer Organization 3(3,0) A course in computer organization and architecture. Topics include a review of logic circuits, bus structures, memory organization, interrupt structures, arithmetic units, input-output structures, state generation, central processor organization, control function implementation, and data communication. *Preq:* CPSC 230 or E&CE 250, or consent of instructor.

430, 630 Digital Communications 3(3,0) A course in modern digital communications theory. Topics covered are discrete time signals, discrete Fourier transforms, channel bandwidth, channel distortion, coding of analog information, data signal encoding, introduction to decision theory, matched filter, baseband systems, AM, FM, PM, phase-locked loops, secure communications, and contemporary communications systems. *Preq:* E&CE 317.

431, 631 Digital Electronics 3(2,2) Electronic devices and circuits of importance to digital computer operation and to other areas of electrical engineering are considered. Active and passive wave-shaping, waveform generation, memory elements, switching, and logic circuits are some of the topics. Experimentation with various types of circuits is provided by laboratory projects. *Preq:* E&CE 321.

432, 632 Instrumentation 3(3,0)F Theory and analysis of transducers and related circuits and instrumentation. Generalized configurations and performance characteristics of instruments will be considered. Transducer devices for measuring physical parameters such as motion, force, torque, pressure, flow, and temperature will be discussed. *Preq:* E&CE 321 or consent of department head.

434, 634 Power Electronics 3(3,0)F A study of electronic devices and systems which are designed to control or regulate large amounts of power. Included are SCR applications to inverters, motors controls, high-current power supplies, frequency converters, etc. Also, high-current switching systems, voltage stabilizers, and other power applications of electronics are considered. *Preq:* E&CE 321.

436, 636 Radiation and Wave Propagation 3(3,0)F A study of the theoretical and practical aspects of transmission lines, wave-guides, plane electromagnetic waves, and antennas. Smith chart applications and impedance matching considerations are included. *Preq:* E&CE (PHYS) 341.

437, 637 Laser Technology and Applications 3(3,0)S Design and operating principles of gas and solid-state lasers in engineering terms. Applications to computers, communications, holography, measurements and bioengineering. *Preq:* E&CE (PHYS) 341 or PHYS 441, and 222.

438, 638 Computer Communications 3(3,0) Digital data transmission techniques, modems and communications channels, communications software and protocols, multiprocessors and distributed processing. Concurrency and cooperation of dispersed processors. *Preq:* Senior standing in Electrical Engineering or Computer Science or consent of instructor.

441, 641 Theory of Sequential Machines 3(3,0) Introduction to the theory of computing covering the topics of sequential machines, sequential machine decomposition, formal language theory and Turing machines.

450, 650 Computer System Design Project 2(0,4) A project-oriented course which brings together computer engineering students into teams or project groups. Assignments are made to each group which are designed to help develop an appreciation for individual and creative thinking as well as team effort. *Preq:* E&CE 425, 426, or consent of instructor.

451, 651 System Design Project 2(0,4)F, S A project-oriented course which brings together electrical engineering students of dissimilar training into teams or project groups. Assignments are made to each group which are designed to help develop an appreciation for individual and creative thinking as well as team effort. *Coreq:* E&CE 410.

452, 652 Programming Systems 3(3,0)S A second course in programming languages and systems. Topics include assemblers, compilers and syntactical methods; string manipulation and list processing; concepts of executive programs and operating systems; introduction to time-sharing systems. *Preq:* E&CE 250; 352 is recommended.

454, 654 Physiological Control Systems 3(2,2) Control theory will be introduced to the level that frequency domain analysis and computer simulation using CSMP can be used. Emphasis will be placed on computer modeling of the pulmonary, renal, hormonal, and cardiovascular systems. *Preq:* Senior standing, consent of instructor.

458, 658 Circuit Design of Modern Analog Filters 3(3,0) Review of resistor op amp circuits, bilinear transfer functions, cascade design, biquadratic realizations, Butterworth and Chebyshev filters, sensitivity, frequency and network transformations, component and operational simulation of LC ladders, switched capacitor filters. *Preq:* E&CE 301, 330. *Coreq:* E&CE 302.

459, 659 Computer-Aided Design of Electronic Circuits 3(3,0) Review of matrices, computer solution of linear algebraic equations, nodal formulation of network equations, Bode and Blackman feedback theory, BJT and MOS modeling, high-frequency amplifier design, DC analysis of nonlinear circuits, transient analysis, sensitivity analysis, reciprocity and interreciprocity and the adjoint circuit with applications. *Preq:* E&CE 302, 321.

460, 660 Computer-Aided Analysis and Design 3(3,0)F Principles and methods suited to the solution of engineering problems on the digital computer. Topics include widely used methods for the solution of the systems of algebraic and/or differential equations which arise in the modeling of engineering systems, data approximation and curve fitting, continuous system simulation languages, and design-oriented programming systems. *Preq:* E&CE 301 or consent of department head.

461, 661 Analog/Hybrid Computation and Simulation 3(2,2)F Topics include nonlinear modeling, function generation, signal processing, and an introduction to hybrid computing. *Preq:* E&CE 301, 330, or consent of department head.

463, 663 Microcomputers II 3(2,2) Single-chip microcomputers: hardware, software, interfacing. Systems design using currently available peripheral chips. Single-board computers. Detailed study

of chip-slice microprocessors. Present and future trends in microcomputer hardware, software, and architecture. *Preq:* E&CE 425, 426.

467, 667 Introduction to Digital Signal Processing 3(3,0) Discrete time signals and systems, z-transforms, digital filter design techniques, properties and computation techniques of the discrete Fourier transform. *Preq:* E&CE 302.

470, 670 Computer Applications for Nonengineers 3(3,0) Introduction to computers for nonengineering majors. History of computers; algorithms; introduction to programming in BASIC; hardware components; simulation; applications in urban and government systems, humanities, education, behavioral sciences, arts, and other areas; impact of computers on society; computers and the future. Not open to engineering majors. *Preq:* Senior standing.

471, 671 Microcomputer Applications in Medical Instrumentation 3(3,0) A study of state-of-the-art techniques of analysis and monitoring in clinical and research environments. Electrocardiographic (ECG) and electroencephalographic (EGG) analysis and monitoring will be discussed in detail. Automation of other clinical facilities such as intensive care and the catheterization laboratory will be considered. Microcomputer design considerations will be emphasized. *Preq:* E&CE 425 or equivalent microcomputer experience.

491, 691 Selected Topics 1-3(1-3,0) Study of current and new technical developments in electrical engineering. *Preq:* Consent of the department head.

701 Special Problems 1-3

801 Analysis of Linear Systems 3(3,0)

802 Electric Motor Control 3(3,0)

803 Linear Control Theory and Design 3(3,0)

804 Optimal Control Theory 3(3,0)

805 Stochastic Optimal Control 3(3,0)

806 Identification in Control 3(3,0)

807 Power System Analysis Techniques 3(3,0)

808 Self-Organizing Control 3(3,0)

809 Semiconductor Materials 3(3,0)

817 Power System Transients 3(3,0)

819 Detection and Estimation Theory 3(3,0)

820 Theory of Communications I 3(3,0)

821 Theory of Communications II 3(3,0)

822 Information Theory 3(3,0)

823 Integrated Circuit Technology 3(3,0)

825 Solid-State Electronics 3(3,0)

830 Electromagnetics 3(3,0)

840 Physics of Semiconductor Devices 3(3,0)

841 Distributed Computing and Networks 3(3,0)

842 Advanced Computer Architecture 3(3,0)

843 Computer Graphics 3(3,0)

844 Digital Signal Processing 3(3,0)

845 Computer System Design and Operation 3(3,0)

846 Digital Processing of Speech Signals 3(3,0)

847 Digital Image Processing 3(3,0)

850 Computation and Simulation 3(3,0)

851 Theory and Design of Digital-Analog Machines 3(3,0)

852 Digital Computers and Information Processing 3(3,0)

853 Computer Data Displays 3(3,0)

855 Artificial Intelligence 3(3,0)

856 Pattern Recognition 3(3,0)

857 Coding Theory 3(3,0)

858 Automata Theory 3(3,0)

870 Biosystems Analysis 3(3,0)

890 Special Problems in Electrical and Computer Engineering 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

893 Selected Topics in Electrical and Computer Engineering 1-3(1-3,0)

991 Doctoral Research. Credit to be arranged.

ENGINEERING (ENGR)

110 Engineering Problems Workshop 1(0,2) A workshop devoted to the analysis and solution of engineering-oriented problems. Representative problems taken from the different fields of engineering will be used to illustrate such analytical and problem-solving techniques as estimation and approximation, numerical aids to computation, and solutions by graphical methods.

180 Engineering Concepts 3(2,2) An introduction to the profession of engineering. The engineering process, from problem formulation to the evolution of creative design, is demonstrated through the practical application of engineering problems. The utility and significance of computing devices in engineering practice are emphasized. Computer programming is introduced.

220 Technology in the Modern World 3(3,0) A course designed to give the nontechnical student a better appreciation of the effect of technical forces on world events. Topics will include systems analysis, energy sources and systems, automation, computer and interaction of technology and the social system. Not open to engineering majors. *Preq:* Sophomore standing or consent of instructor.

250 Systems Internationale—The Modern Metric System 1(1,0) Public Law 94-168 proclaims that the United States is converting to the modern metric system. This course, taught for all University students, will present the fundamentals of SI metric and will discuss the impact of converting to SI on business, industry, education, and the consumer.

ENGINEERING GRAPHICS (EG)

Associate Professors: L. H. Jameson, J. R. McCravy, Jr., D. L. Ryan; *Assistant Professor:* V. B. Anand; *Visiting Assistant Professor:* P. L. Burati

101 Freehand Sketching 1(0,3) Principles of technical sketching, including the development of skills in technical lettering and freehand orthographic and pictorial drawing.

105 Engineering Drawing 2(1,3) A course in engineering drawing using the following procedures and techniques: lettering, use of instruments, plats, traverses, contour plotting and mapping, profile sections, and chart drawing.

109 Engineering Graphics 2(1,3) A course for the introduction of engineering graphics as a problem-solving tool. Areas of study include theory of orthographic points, lines, planes, and solids; sectional views; dimensioning; and design drawings.

110 Engineering Design Graphics 2(1,3) Continuation of EG 109. Emphasis is placed on graphical analysis as a means for evaluating a design. Units of study include descriptive and vector geometry, graphical statistics, and computer graphics. *Preq:* EG 109. *Coreq:* CPSC 110 or equivalent.

310 Computer-Aided Graphics 3(3,0) The use of automated graphic devices and systems is presented through a computer format for successful operation, digitizing, plotting, and display of

engineering drawings. Upon completion, the student should be proficient in preparing and storing software such as that used in conjunction with the IBM 370 and CALCOMP digital plotter. *Preq:* EG 110.

410 Computer-Aided Design Graphics 3(3,0) Continuation of EG 310 with special emphasis on sculptured surfaces. The process involves translation from designer notes, to animated drawing, to testing model, and finally to a three-dimensional computer display. The student will learn how to apply the theory of CAD graphics to the solution of product design problems. *Preq:* EG 310.

411 Computer-Aided Process Planning—Graphics 3(3,0) This course introduces the student to the computer-aided processes used in the A&E office. It is designed to be compatible with current industrial practices, equipment, and procedures to produce construction drawings. *Preq:* Senior standing or consent of department head.

490 Special Topics in Engineering Graphics 1-3(1-3,0) A comprehensive study of any computer-aided topic in engineering graphics not covered in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of department chairman.

ENGINEERING MECHANICS (EM)

Professors: S. C. Anand, N. R. Bauld, Jr., R. H. Brown, E. F. Byars, W. E. Castro, J. G. Goree, E. H. Law, M. K. Richardson; *Associate Professors:* R. E. Elling, J. E. Jackson, Jr., R. F. Nowack, B. L. Sill, P. R. Sparks; *Visiting Assistant Professor:* W. F. Jones

201, H201 Engineering Mechanics: Statics 3(3,0) Forces and force systems and their external effect on bodies, principally the condition of equilibrium. The techniques of vector mathematics are employed, and the rigor of physical analysis is emphasized. *Preq:* PHYS 122. *Coreq:* MTHSC 206.

202, H202 Engineering Mechanics: Dynamics 3(3,0) A continuation of EM 201. The principal topics are kinematics and kinetics of particles and rigid bodies of finite size. Techniques of vector mathematics are employed. *Preq:* EM 201, MTHSC 206.

211 Particle Mechanics: Statics and Dynamics 3(3,0) Force and force systems and their effect on particles; the conditions of equilibrium and the kinematics and kinetics of particle motion. The techniques of vector mathematics are employed, and the rigor of physical analysis is emphasized. *Preq:* MTHSC 206, PHYS 122.

304, H304 Mechanics of Materials 3(3,0) The relationships between external loads on solid bodies or members and the resulting internal effects and dimension changes, including the derivation of rational formulas for stresses and deformations and the identification and use of important mechanical properties of engineering materials. *Preq:* EM 201, MTHSC 206.

305 Mechanics of Materials Laboratory 1(0,3) Theoretical relationships considered in EM 304 are verified. Students observe the behavior under load and the failure of engineering materials; identify and evaluate mechanical properties of materials important to design and manufacturing processes; and are acquainted with various testing methods, testing machines, and instruments. *Preq:* Must be accompanied or preceded by EM 304.

320, H320 Fluid Mechanics 3(3,0) The behavior of fluids at rest or in motion, including the study of fluid properties. Emphasis is placed upon a rational, analytical approach from which are developed basic principles of broad applicability to all fields of engineering. *Preq:* EM 202 or 211.

322 Fluid Mechanics Laboratory 1(0,3) The principles developed in EM 320 are verified and demonstrated. Familiarization with orderly techniques in organizing and reporting results of experimental investigations and with the use of instruments and equipment is afforded. *Preq:* Must be accompanied or preceded by EM 320.

425, 625 Advanced Strength of Materials 3(3,0) Topics in strength of materials not covered in EM 304. Three-dimensional stress and strain transformations, theories of failure, shear center, unsymmetrical bending, curved beams, and energy methods. Other topics such as stress concentrations and fatigue concepts are treated as time permits. *Preq:* EM 304.

450, 650 Mechanical Vibrations 3(3,0) Mathematical analysis of physical problems in the vibratio of mechanical systems. Topics include linear-free vibrations, forced vibrations, and damping i single degree of freedom systems, transient vibrations, critical speeds and whirling of rotatin shafts, dynamic balancing, and multidegree of freedom systems with lumped parameters. *Preq* EM 202, 304, MTHSC 208.

470, 670 Experimental Stress Analysis 3(2,3) Experimental analysis of static and dynamic stres fields. Emphasis is on the techniques required to obtain data and the theoretical analysis require for proper interpretation. Methods and instrumentation associated with strain gages (includin transducer applications), Moire grids, brittle coatings, photoelasticity, and photoelastic coating are studied. *Preq:* EM 304 and consent of instructor.

829 Energy Methods and Variational Principles 3(3,0)

831 Theory of Elasticity I 3(3,0)

832 Theory of Elasticity II 3(3,0)

834 Principles of Structural Stability 3(3,0)

845 Intermediate Dynamics 3(3,0)

891 Master's Research. Credit to be arranged.

893 Selected Topics in Engineering Mechanics 1-6(1-6,0)

991 Doctoral Research. Credit to be arranged.

ENGINEERING TECHNOLOGY (ET)

Professor: C. R. Lindenmeyer; *Associate Professors:* R. J. Kopczyk, T. H. Oswald, R. L. Perry, R. M. Roberds, *Head;* C. K. Roby, E. L. Sheppard; *Visiting Professor:* L. O. Drew; *Visiting Associate Professor:* G. R. Fletcher; *Visiting Instructor:* D. A. Mitta; *Adjunct Associate Professor:* W. J. Barnett; *Adjunct Assistant Professor:* W. H. Chasteen

201 Manufacturing Processes 3(2,3) Study of methods of conversion of raw materials into finished products. Includes basic terminology, interpretation and use of engineering plans, impact of production volume, and manufacturing control. Various manufacturing processes including material removal, casting, joining and forming of materials, and associated measurement techniques are examined. *Preq:* EG 109 or equivalent.

204 Methods and Standards 3(2,3) Through the spring of 1986. Fundamentals relating to work-methods design and analysis. Includes study of techniques necessary for determining efficient work methods. Work measurement as a basis for control of costs and scheduling. *Preq:* Consent of instructor.

207 Introduction to Industrial Engineering Technology 3(3,0) An introduction to the industrial engineering technologist's role in modern industrial enterprises. Topics such as industrial organization, production planning and control, personnel management, plant layout, manufacturing systems analysis, and work standards are included.

211 Electrical Circuits I 3(2,3) A study of direct and alternating current circuits. Circuits theorems are introduced in the DC and AC coverage. Emphasis is placed on steady-state conditions and power relationships in circuits with sinusoidal excitations. Magnetic circuits and AC/DC machinery theory are introduced. *Preq:* Consent of instructor.

212 Electrical Circuits II 4(3,3) Continuation of ET 211. A thorough coverage of polyphase circuits is included. *Preq:* ET 211.

221 Elements of Electronics 3(2,3) Theory and operation of electronic circuits and control with emphasis on equipment for industrial application. *Preq:* ET 211.

241 Statics and Strength of Materials 3(3,0) Resolution of force systems, static equilibrium, centroids and center of gravity, friction, static analysis of structures. Mechanics of deformable bodies including stress, deformation and material properties in tension, compression and shear. *Preq:* PHYS 207.

295 Problems in Technology 3(3,0) The application of basic college mathematics, including differential and integral calculus, to problems found in a broad range of categories corresponding to the Engineering Technology curriculum requirements. Major categories covered include electrical, mechanical, heat power, and processes considerations. *Preq:* MTHSC 108 or equivalent.

322 Electronic Circuits 4(3,3) A study of the application of semiconductor diodes, transistors, integrated circuits, and other devices in circuits used in industrial equipment and consumer products. Content includes power supplies, regulators, large and small signal amplifiers, oscillators, and operational amplifiers. *Preq:* ET 221, 295. *Coreq:* ET 212.

325 Electronic Communications 4(3,3) A study of communications circuits, receivers, and transmitters. Content includes AM and FM modulation, amplifiers, networks and filters, antennas and transmission lines. *Preq:* ET 322.

331 Electrical Machinery 4(3,3) Coverage includes the theory of operation and application of DC and AC machines and transformers. External characteristics are depicted from the machine equivalent circuit. *Preq:* ET 212.

341 Mechanical Engineering Technology Laboratory 1(0,3) The course is intended to illustrate theory covered in previous mechanical engineering technology courses, to develop experimental technique, to interpret data and results, and to develop basic skills in technical writing. *Preq:* ET 241.

343 Applied Fluid Mechanics 3(2,3) Principles of fluid properties, fluid statics, fluid flow, dimensional analysis, ideal flow, compressible flow, measurements and equipment. *Preq:* ET 241.

345 Applied Kinematics and Dynamics 4(3,3) Graphical analysis of displacements, velocities and accelerations in translation, rotation and general plane motion. Newton's laws of motion are covered in conjunction with force analysis of cams, gears and gear trains, and mechanisms commonly encountered in the design of machines. *Preq:* CPSC 110 and ET 241 or equivalent.

351 Applied Thermodynamics I 3(3,0) First and second laws of thermodynamics, thermodynamic properties, thermodynamic processes, and elementary heat transfer. *Preq:* Consent of instructor.

352 Applied Thermodynamics II 4(3,3) Internal combustion engines, gas turbines, air compressors, flow in nozzles, refrigeration and steam power plant cycles. *Preq:* ET 351.

361 Industrial Application of Statistics 3(3,0) Through the spring of 1986. Application of statistical principles of analysis and control to production processes, studies of process capabilities, quality control, work sampling, reliability analysis and machine interference. *Preq:* EXST 301 or equivalent.

365 Industrial Process Measurement and Control 3(2,3) An applied approach to industrial control theory. Electronic, pneumatic, mechanical, and hydraulic measurement and control devices are studied. Techniques are discussed for analyzing process control problems and selecting proper measuring and controlling equipment in control system design. *Preq:* ET 221, 295.

375 Materials of Industry 3(3,0) The technological applications of ceramic, metallic, polymeric, and composite materials to a variety of industrial environments. Guidelines are given for the selection of materials based upon material properties, economic considerations, and typical applications as related by case histories. *Preq:* ET 241.

403 Process Planning and Value Analysis 3(3,0) Study of the techniques of manufacturing and technology applied to industrial operations. Value analysis concepts and techniques are introduced. Emphasis is placed on decision-making for process and equipment selection including capital investment analysis. Particular attention is given to surveying current literature. *Preq:* ET 201 or consent of instructor.

404 Advanced Methods and Standards 3(2,3) Through the spring of 1986. Synthesis of effective work methods using a predetermined basic motion-time system. Methods-time measurement is covered in detail. Standard data development and administration. Linear and multiple regression analysis for time formula development. *Preq:* ET 204 or MGT 408 or consent of instructor.

405 Plant Layout and Material Handling 3(2,3) Through the spring of 1986. Fundamentals underlying the planning of factory layout for new products and increases in production volume. Layout by product and process. Scale model, template, and other planning techniques. Materials handling analysis and equipment decisions. *Preq:* ET 201, 204 or MGT 408, or consent of instructor.

411 Computer Controlled Machining Operations 3(2,3) Introduction to computer-aided manufacturing. Exploration of modern computer-aided and numerical-control machining techniques. Special laboratory investigations centered around a computer-controlled milling machine and effective utilization of equipment that is currently available in the market place. *Preq:* ET 201, 365, or equivalent.

415 Minicomputers and Microcomputers 4(3,3) Introductory course in mini- and microcomputers, switching algebra, logic design, number systems, computer organizations, assembly language programming, microprocessors, mini- and microcomputer system components and interfacing concepts. *Preq:* ET 322, 365.

423 Electrical Engineering Technology Laboratory 1(0,3) The laboratory will provide the student with a variety of experiences such as learning the correct application of tools and instruments in the fabrication and testing of electronic circuits. The student will also perform diagnostics on instruments and perform instrument calibration and measurements. *Preq:* ET 322, 365.

435 Electrical Power Systems 3(3,0) A study of the generation, transmission, and distribution of electrical energy. Includes economic consideration of power plant operation, protective relaying, transformers, per unit system, and symmetrical components. *Preq:* ET 295, 331.

452 Power Production and Utilization 3(3,0) A course designed to apply the student's background developed in the study of thermodynamics and mechanics to the solution of problems encountered in thermal and hydraulic power systems and their industrial applications. Topics covered are energy, processing, steam, internal combustion, hydropower sources, and economics of energy application. *Preq:* ET 343, 352.

455 Heating and Air Conditioning 3(3,0) Psychrometric properties and processes; heating and cooling load calculations; selection and layout of major equipment for heating systems and air-conditioning systems, refrigeration, and automatic controls. *Preq:* ET 343, 352.

461 Machine and Component Design 3(2,3) Basic instruction in the design and analysis of machine and machine components with emphasis on realistic and functional application. Kinematic and dynamic characteristics of the mechanical system together with wear, fatigue, structural soundness, safety, and others will be a major consideration of the analysis. *Preq:* EG 110, ET 345.

462 Mechanical Systems Design 3(2,3) Continuation of ET 461. Integration of standard and custom-designed components into complete, functional, mechanical systems. A total systems concept including power requirements, drive specifications, controls, and economic considerations will be emphasized. *Preq:* ET 461.

488 Human Factors Technology 3(2,3) Through the spring of 1986. A study of human characteristics and limitations as they affect the design of operating systems. Application of the human factors data base including anthropometric data and behavioral and physiological research to practical design problems involving the work environment, tools and equipment, and consumer products. *Preq:* EXST 301 or equivalent, or consent of instructor.

490 Selected Topics in Engineering Technology 1-3(1-3,0) A comprehensive study of any timely or special topic in engineering technology not covered in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

491 Technical Project Identification and Specification 1(0,3) A preparatory course for Engineering Technology majors starting their technical design project, including faculty consultations, seminars, field trips, literature search, project identification and specification, and proposal writing. *Preq:* Senior standing. *Coreq:* ENGL 314.

492 Technical Design Project 1(0,3) A senior technical design project performed in consultation with one or more faculty advisers. Collaboration with representatives of industry, government

agencies, or community institutions is encouraged. A final written technical report, with evidence of extensive development and/or laboratory performance and tests, is required. *Preq:* ET 491.

493 Field Internship 2(0,6) Full-time work in the field requiring the application of engineering technology to real-world problems. A faculty-supervised project is required, the results of which will be presented to a departmental faculty review committee for evaluation. May be taken, with prior permission and arrangements, in lieu of ET 491 and 492. *Preq:* Senior standing.

ENGLISH (ENGL)

Professors: R. J. Calhoun, J. L. Idol, Jr., M. T. Inge, *Head;* J. J. McLaughlin, R. W. Moran, R. B. Rollin, M. S. Steadman, Jr.; *Associate Professors:* R. E. Barfield, Jr., H. B. Bryant, C. O. Caskey, F. L. Day, C. S. Egan, S. K. Eisiminger, L. L. Henry, R. W. Hill, G. W. Koon, R. F. Lunsford, J. B. McLaughlin, V. A. Rudowski, C. H. Sawyer, F. W. Shilstone, B. N. Skardon, R. A. Underwood, M. O. Usrey, E. P. Willey, C. H. Woodell; *Assistant Professors:* D. G. Bzdyl, L. Carrillo, B. K. Duffy, S. Duffy, D. N. Griffin, J. L. Hodgin, D. S. Journet, M. G. Moran, H. J. Nuwer, R. C. Sawyer, J. B. Simms, E. K. Sparks, J. P. Stanton, D. C. Tillinghast, C. M. Ward; *Instructors:* E. R. Beck, P. J. Dakutis, J. L. Dezen, L. D. Egan, P. A. Fairbanks, S. L. Inman, K. J. Kirkpatrick, N. B. Lafferty, L. M. Littlefield, D. B. Pittman, A. M. Plevin, R. V. Rash, M. K. Reel, S. S. Titus; *Visiting Assistant Professors:* C. L. Ellison, T. B. Inge, C. E. Johnston, M. H. Moran, A. J. O'Keeffe; *Visiting Instructors:* C. Axel, D. L. Beckley, G. M. Donahue, D. D. Moore, C. Paulenich, B. J. Ramirez, M. E. Rukstelis, S. T. Stage

100 English Fundamentals 3(5,0) Drill in basic writing skills: mechanics, spelling, syntax, usage, dialect, sentence clusters, and paragraphing. Required of all freshmen who do not make a satisfactory score on the SAT verbal.

101, H101 Composition I 3(3,0) Training in correct and effective expression, in brief expository essays; review of the fundamentals of grammar and punctuation; instruction in common expository methods.

102, H102 Composition II 3(3,0) Continued emphasis on correct and effective expression; training in the organization and writing of the research report. *Preq:* ENGL 101.

111 English As a Second Language 3(3,2) A special course for students learning English as a second language. Intensive study and drill in American English pronunciation and listening comprehension. Required of all foreign students who do not make a satisfactory grade on screening examinations in oral English.

170 Theatre Appreciation 1(0,3) Examination of theatre history, genres, and production practices through discussions, demonstrations, and field trips to live dramatic performances.

202 The Major Forms of Literature 3(3,0) A study of the basic structures and elements of fiction, poetry, and drama, including literary and critical theory, with readings in American, British, and world literature. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

203, H203 Survey of English Literature I 3(3,0) Chief British authors and works from *Beowulf* to the Romantic period. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

204, H204 Survey of English Literature II 3(3,0) Chief British authors and works from the Romantic period to 1945. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

205, H205 Survey of American Literature I 3(3,0) American literature to the Civil War, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

206, H206 Survey of American Literature II 3(3,0) American Literature from the Civil War to 1945, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

207 Survey of World Literature I 3(3,0) Translations of continental European literature from Homer to the Renaissance (together with some Asian classics), with emphasis on major authors. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

208 Survey of World Literature II 3(3,0) Translations of continental European literature from the seventeenth century to the present (together with some Asian classics), with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

209 Contemporary Literature 3(3,0) A study of selected writers since 1945, primarily British and American. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

217 Vocabulary Building 3(3,0) Development of a useful discriminating vocabularly for writing, speaking, and reading. Student notebooks and proficiency quizzes. *Preq:* ENGL 101, 102.

231 Introduction to Journalism 3(3,0) Instruction and practice in writing for mass media; editorial responsibilities. *Preq:* ENGL 102.

260 Introduction to Broadcasting 3(3,0) The history and scope of radio and television broadcasting in America.

301 Public Speaking 3(3,0) Practical instruction in public speaking; practice in the preparation, delivery, and criticism of short speeches. *Preq:* Sophomore standing.

304 Business Writing 3(3,0) An introduction to business writing: memoranda, letters, reports, and research methods. *Preq:* Sophomore literature.

312 Advanced Expository Writing 3(3,0) A workshop in practical writing focusing on principles and style. *Preq:* Sophomore standing.

314 Technical Writing 3(3,0) Intensive training in the fundamentals of technical writing: reports, letters, and memoranda. *Preq:* Sophomore English.

331 Publications Workshop 1(1,0) Workshop designed for students who serve on student publication staffs. This course emphasizes the responsibilities of staff members. May be repeated for a maximum of three credits. *Preq:* ENGL 102 and consent of the instructor.

333 Reporting for the News Media 3(3,0) Practical experience in gathering and writing news and feature copy for the media, concentration on print journalism; examination of the role of the modern journalist; laws governing the profession, journalistic ethics. *Preq:* ENGL 231 or consent of instructor.

334 Feature Writing 3(3,0) Practical experience in writing feature articles for newspapers, magazines, and free-lance markets. *Preq:* ENGL 231 or consent of instructor.

335 Editing for Newspapers 3(3,0) An examination of the editing process at newspapers and magazines. Practical experience in article selection, copy-editing, headline and blurb writing, and page design. *Preq:* ENGL 231 or consent of instructor.

345 The Structure of Fiction 3(3,0) An introduction to the creative writing and critical study of prose fiction. *Preq:* Sophomore standing.

346 The Structure of Poetry 3(3,0) An introduction to the creative writing and critical study of poetry. *Preq:* Sophomore standing.

347 The Structure of Drama 3(3,0) Introduction to the creative writing and critical study of drama. *Preq:* Sophomore standing.

350 Mythology 3(3,0) A study of the great myths of the world with an emphasis on their applications to literature. *Preq:* Sophomore standing.

351 American Folklore 3(3,0) A study of American folklore with an emphasis on such considerations as the folktale, folk songs and ballads, folk heroes, and folk superstitions and remedies. *Preq:* Sophomore standing.

353 Ethnic American Literature 3(3,0) A critical examination of essays, poetry, fiction, and drama written by members of a variety of American racial and ethnic groups, such as Native Americans, Afro-Americans, Chicano-Mexicans, Asian Americans, Italian Americans, and American Jews. *Preq:* Sophomore standing.

355 Popular Culture 3(3,0) An examination of the nature, functions, history, and impact upon American society of best sellers, popular magazines, television, movies, and other like phenomena. *Preq:* Sophomore standing.

356 Science Fiction 3(3,0) Readings in science fiction from the seventeenth century to the present, with special emphasis on writers since Verne and Wells. *Preq:* Sophomore standing.

357 Film 3(3,0) An examination of the film medium as an art form: its history, how films are made, why certain types of films (western, horror movies, and so forth) have become popular, and how critical theories provide standards for judging film. *Preq:* Sophomore standing or consent of instructor.

358 Advanced Studies in Film 3(2,3) Continued study of film theory and aesthetics, with applications of that knowledge to the making of a film. *Preq:* ENGL 357 and consent of instructor.

359 Special Topics in Language, Literature, or Culture 3(3,0) Studies in varied topics not central to other English courses, such as Literature and Art/Business/Sports; Language and Style; Black Literature. Specific titles and course descriptions to be announced from semester to semester. May be repeated once with department head's consent. *Preq:* Sophomore standing.

360 Persuasion 3(3,0) Theories of persuasion and propaganda; practical instruction in the composition of persuasive speeches. *Preq:* Sophomore standing.

361 Argumentation and Debate 3(3,0) The basic principles of argumentation with emphasis on developing practical skills in argumentative speech. The role of the advocate in contemporary society and an analysis of selected significant debates in U.S. history. *Preq:* Sophomore standing.

362 Forensic Laboratory 1(0,3) Organized preparation for participation in college speech activities, intercollegiate, campus, and community programs. May be repeated for a maximum of three credits.

363 Oral Interpretation of Literature 3(3,0) Analysis and oral interpretation of selected poetry and prose; training in development of effective tone production. *Preq:* Sophomore standing.

364 Organizational Communication 3(3,0) Theories and techniques of communications within small groups and other organized bodies. *Preq:* Sophomore standing.

366 Special Topics in Speech 3(3,0) Consideration of select major areas of study in speech. *Preq:* Sophomore standing.

368 Voice and Diction 3(3,0) Practical training in speech, with emphasis on clarity, vocal variety, and tone quality. *Preq:* Sophomore standing.

369 Modern American Political Rhetoric 3(3,0) An examination of American political rhetoric after 1900, focusing on such notable speakers as Franklin D. Roosevelt, John F. Kennedy, and Martin Luther King, Jr. *Preq:* Sophomore standing.

375 Principles of Acting 3(2,3) The fundamentals of acting; basic stage techniques; exercises in interpretation, improvisation, characterization; experience in supervised performance. *Preq:* Sophomore standing.

376 Principles of Stage Direction 3(2,3) Directing and staging techniques for the proscenium stage; exercises in composition, movement, picturization; experience in direction of scenes. *Preq:* Sophomore standing.

377 Principles of Stage Design 3(2,3) Theory and practice of stage design and technology. *Preq:* Sophomore standing.

378 Survey of the Theatre 3(3,0) A historical approach to the dynamics of playwright, director, actor, technician, and spectator in the theatre. *Preq:* Sophomore standing.

379 Theatre Laboratory 1(0,3) Practical work in theatre on a production designed for public presentation. May be repeated for a maximum of three credits. *Preq:* Sophomore standing.

385 Children's Literature 3(3,0) Wide reading in prose and verse suitable for children in elementary grades. *Preq:* Sophomore standing.

386 Adolescent Literature 3(3,0) Wide reading in prose and verse suitable for children in secondary schools. *Preq:* Sophomore standing.

392 Technical Editing 3(3,0) Practical experience in editing and preparing technical manuscripts for publication. General introduction to the functions of the technical editor. *Preq:* ENGL 304 or 314.

400, 600 The English Language 3(3,0) Studies in English usage and the historical development of the language. *Preq:* Sophomore English.

401, 601 The Structure of Modern English 3(3,0) Structural linguistic analysis; principles of phonology, morphology, and syntax as related to traditional, structural, and transformational grammars. Recommended for English teachers. *Preq:* Sophomore English.

403, 603 The Classics in Translation 3(3,0) An examination of Homer's *Iliad* and *Odyssey*, Virgil's *Aeneid*, and Ovid's *Metamorphoses*. A few shorter works by other Greek and Roman writers may also be read. *Preq:* Sophomore English.

404, 604 Classical Drama 3(3,0) Selected reading in the dramatic literature of classical Greece and Rome. *Preq:* Sophomore English.

405, 605 Studies in English Literature to 1700 3(3,0) Selected readings in English literature from the beginnings to 1700, with emphasis on social and intellectual backgrounds. *Preq:* Sophomore English.

406, 606 Studies in English Literature Since 1700 3(3,0) Selected readings in English literature from 1700 to the present, with emphasis on social and intellectual backgrounds. *Preq:* Sophomore English.

407, 607 The Medieval Period 3(3,0) Selected works of Old and Middle English literature, exclusive of Chaucer. *Preq:* Sophomore English.

408, 608 Chaucer 3(3,0) Chaucer as an artist; the "Prologue" for historical and linguistic orientation; *The Canterbury Tales, House of Fame, Parliament of Fowls,* and *Troilus and Criseyde* as art forms. *Preq:* Sophomore English.

409, 609 The Earlier English Renaissance 3(3,0) Tudor and Elizabethan poetry, prose, fiction, translations, essays, and criticism. *Preq:* Sophomore English.

410, 610 Drama of English Renaissance 3(3,0) Selected readings in non-Shakespearean dramatic literature of the 16th and 17th centuries. *Preq:* Sophomore English.

411, 611 Shakespeare 3(3,0) A study of selected tragedies, comedies, and history plays of Shakespeare. Required of all English majors. *Preq:* Sophomore English.

412, 612 Studies in Shakespeare 3(3,0) Special topics in Shakespeare as selected by instructors. *Preq:* Sophomore English.

413, 613 Later English Renaissance 3(3,0) Nondramatic poetry and prose from Ben Jonson, John Donne, and Francis Bacon through Andrew Marvell and John Bunyan, excluding Shakespeare and Milton. *Preq:* Sophomore English.

414, 614 Milton 3(3,0) The development of Milton's art and thought from the minor poems and selected prose through *Paradise Lost, Paradise Regained,* and *Samson Agonistes,* set against the background of the late Renaissance. *Preq:* Sophomore English.

415, 615 The Restoration and Eighteenth Century 3(3,0) Readings in Dryden, Swift, Pope and Dr. Johnson. *Preq:* Sophomore English.

416, 616 The Romantic Period 3(3,0) Readings from the poetry and critical prose of Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and other representative figures. *Preq:* Sophomore English.

417, 617 The Victorian Period 3(3,0) Reading from the poetry and nonfiction prose of selected Victorian authors, including works of Carlyle, Tennyson, Browning, Arnold, and other representative figures. *Preq:* Sophomore English.

418, 618 The English Novel 3(3,0) Study of the English novel from its 18th century beginnings through the Victorian Period. *Preq:* Sophomore English.

422, 622 American Literature I 3(3,0) Major American authors and movements from the Colonial period to the Civil War. *Preq:* Sophomore English.

423, 623 American Literature II 3(3,0) Major American authors and movements from the Civil War to the early 20th century. *Preq:* Sophomore English.

24, 624 American Literature III 3(3,0) Major American authors and movements of the 20th century. *req:* Sophomore English.

25, 625 The American Novel 3(3,0) A survey of the most significant forms and themes of the merican novel from its beginnings to 1900. *Preq:* Sophomore English.

26, 626 Southern Literature 3(3,0) The intellectual and literary achievement of the South from 607 to the present, with emphasis upon the writers of the 19th century. *Preq:* Sophomore English.

30, 630 Modern Drama 3(3,0) Principles and progress of drama from Ibsen to the present; analysis f representative plays; critical reports; discussion of trends in contemporary drama. *Preq:* ophomore English.

31, 631 Modern Poetry 3(3,0) The modern tradition in English and American poetry from Yeats to he present; relevant critical essays. *Preq:* Sophomore English.

32, 632 Modern Fiction 3(3,0) American and British novels and short stories of the 20th century. *'req:* Sophomore English.

35, 635 Literary Criticism 3(3,0) Major critical approaches to literature. *Preq:* Sophomore English.

37 Directed Studies 1-3(1-3,0) Class and tutorial work for students with special interests or projects n American, British, or European literature outside the scope of existing courses. May be repeated y arrangement with the department. *Preq:* Junior standing.

1438 Senior Division Honors Research 3(3,0) Research for the preparation of an honors project. *'req:* Senior standing, and approval of the Department of English and the University Honors Pro- ram Committee.

1439 Senior Division Honors Project 3(3,0) Preparation of an honors project. *Preq:* ENGL H438 and enior standing.

45 Fiction Workshop 3(3,0) A workshop in the creative writing of prose fiction. May be repeated ne time for credit. *Preq:* ENGL 345 or consent of instructor.

46 Poetry Workshop 3(3,0) A workshop in the creative writing of poetry. May be repeated one ime for credit. *Preq:* ENGL 346 or consent of instructor.

47 Playwriting Workshop 3(0,3) A workshop in the creative writing of plays. May be repeated one ime for credit. *Preq:* ENGL 347.

55, 655 American Humor 3(3,0) Native American humor of the 19th and 20th centuries. *Preq:* ophomore English.

59 Advanced Special Topics in Language, Literature, or Culture 3(3,0) Advanced studies in topics ot central to other English courses, such as certain authors, works, genres, themes, or areas of nowledge and culture. Specific topics will be announced when offered. May be repeated once or credit with department head's consent. *Preq:* Sophomore English.

75 Advanced Acting 3(2,3) The study and practice of acting styles and techniques, including those or period plays, musicals, and nonproscenium contemporary forms. *Preq:* ENGL 375 or consent of nstructor.

76 Advanced Stage Direction 3(2,3) Study of production practices, problems, and techniques of tyle and composition, including those for period plays, musicals, and plays presented in non- roscenium staging areas. *Preq:* ENGL 376 or consent of instructor.

77 Advanced Stage Design 3(2,3) Study and practice in stage design, including drafting, graphics, drawing, rendering, scene painting, and light plotting. *Preq:* ENGL 377 or consent of instructor.

85, 685 Composition for Teachers 3(3,0) Practical training in teaching composition: finding workable topics, organizing and developing observations and ideas, evaluating themes, and creative writing. *Preq:* Sophomore English.

90 Advanced Technical and Business Writing 3(3,0) Advanced work in writing proposals, manuals, reports, and publishable articles. Students will produce work individually and in groups. *Preq:* ENGL 304 or 314.

700 Children's Literature for Teachers 3(3,0)

701 Literature for Teachers 3(3,0)

800 Introduction to Research 1(1,0)

801 Topics in Composition and Rhetoric 3(3,0)

802 Topics in Literary Genres 3(3,0)

805 Topics in Medieval Literature 3(3,0)

808 Topics in Renaissance and Restoration Literature 3(3,0)

811 Topics in Neoclassical and Romantic Literature 3(3,0)

814 Topics in Victorian and Modern British Literature 3(3,0)

820 Topics in American Literature to 1865 3(3,0)

823 Topics in American Literature Since 1865 3(3,0)

831 Special Topics 3(3,0)

835 Topics in Literary Criticism 3(3,0)

837 Topics in Linguistics 3(3,0)

840 Directed Studies 3(3,0)

891 Master's Research. Credit to be arranged.

ENTOMOLOGY (ENT)

Professors: T. R. Adkins, Jr., G. R. Carner, S. B. Hays, *Head;* R. Noblet, B. M. Shepard, T. E. Skelton; *Associate Professors:* T. M. Brown, J. A. Jordan, J. C. Morse; *Assistant Professors:* D. R. Alverson, J. D. Culin, P. A. Zungoli

200 Insects 2(2,0) An introduction to insects; their various relationships with man, other animals and plants. The general nature of this course makes it beneficial to all students regardless of speciality. Closed to students who have had ENT 301 or equivalent.

301 General Entomology 3(2,3) A general introduction to entomology with emphasis on anatomy, metamorphosis, and description of the most common insect species. Methods of control are introduced and current control practices are explained for some of the more important species.

308 Apiculture 3(2,3) A detailed study of the honey bee and its economic importance in pollination and honey production. Attention will be given to bee behavior, colony management, equipment, honey plant identification, and honey production and processing. *Preq:* BIOL 104, 106, and consent of instructor.

401, H401, 601 Insect Pests of Ornamental Plants and Shade Trees 3(2,3) Recognition, biology, damage and control of insect pests of woody and other ornamental plants and shade trees. *Preq:* ENT 301.

402, H402, 602 Fruit, Nut, and Vegetable Insects 3(2,3) Common insect pests of the following are studied: peaches, apples, grapes, pecans, sweet corn, cole crops, cucurbits, potatoes, sweet potatoes, peas, and beans. Primary emphasis is placed on life histories, identification of destructive forms, recognition of damage, and current control measures. *Preq:* ENT 301.

403, H403, 603 Field Crop Insects 3(2,3) Insect pests of the more important field crops are studied. Primary emphasis is placed on life histories, identification of destructive stages, recognition of damage and current control measures. *Preq:* ENT 301.

404, H404, 604 Structural, Industrial and Household Insects 3(2,3) Recognition, biology, damage, and control of food, stored products, household, structural, and industrial pests. *Preq:* ENT 301.

405, H405, 605 Insect Morphology 4(3,3) A study of insect structure in relation to function and of the variation of form in insects. *Preq:* ENT 301.

410, 610 Insect Taxonomy 3(1,6) The identification of the principal families of the major orders of adult insects. Laboratory work consists of intensive practice of such identification; lecture material

eals with necessary theoretical discussion of taxonomic features observed in the laboratory. *Preq:* NT 405 or consent of instructor.

12, 612 Field and Museum Entomology 3(0,9) Practical aspects of gathering, sorting, and curating nsects. Students participate in an intensive insect-collecting expedition for two weeks in the outheastern States. Students will become acquainted with insect habitats and collecting methods. he remainder of the summer session will be devoted to curatorial preparation of collected naterial. Limited enrollment. *Preq:* ENT 410 and consent of instructor.

20, 620 Toxicology of Insecticides 3(2,3) Concepts of insecticide toxicology; principles of insecicide action; toxicological and pharmacological effects in insects and higher animals, safety, urrent regulations governing the use of insecticides. *Preq:* ENT 301.

55, H455, 655 Medical and Veterinary Entomology 3(2,3) Insects and their arthropod relatives vhich are of economic importance in their effect on man and animals. *Preq:* ENT 301 or consent of instructor.

61 Directed Research in Entomology and Economic Zoology 1-3(0,3-9) Research problems in elected entomological and economic zoology areas to provide the student with experience in planning and conducting research, and presentation of research results. May be repeated for a naximum of three credits. *Preq:* Consent of instructor.

62 Seminar 1(1,0) Literary search and oral presentation of current entomological topics.

68, 668 (WFB) Introduction to Research 2(1,3) Principles, developments and changes in research nethods related to certain fields of biological and agriculture research. The students obtain practice in experimental techniques, scientific writing and the use and maintenance of various instruments and equipment.

69, H469, 669 (WFB) Aquatic Insects 3(1,6) Identification, life history, habitats, and interrelationhips of aquatic insects; techniques of qualitative field collecting; important literature and esearch workers. *Preq:* ENT 301 or consent of instructor.

70, H470, 670 Insect Physiology 3(2,3) An introduction to the physiological systems of insects ncluding structure as related to function. Emphasis will be on digestion, nutrition, reproduction, espiration, excretion, and nervous and hormonal systems as they affect growth and development n insects. *Preq:* ENT 301 or consent of instructor.

80, H480, 680 Insect Pathology 3(2,3) The study of insect diseases including those caused by viruses, rickettsiae, bacteria, fungi, protozoa, and nematodes will be covered in this course. The effects of diseases on insect populations and the use of pathogens in insect control will also be considered in detail. *Preq:* ENT 301 or consent of instructor.

490 Practicum 1-4 Supervised entomological learning opportunity, providing highly individualized experiences to complement other progams and courses. Must be prearranged at least two months in advance. Must file written report midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. *Preq:* Junior standing and consent of instructor.

808 Taxonomy of Immature Insects 3(1,6)

809 Seminar in Entomology 1(1,0)

810 Special Topics in Entomology 1-4(1-4,0)

812 Entomological History and Literature 1(1,0)

840 Insect Ecology 3(2,3)

853 Applied Systematics 3(2,3)

856 Medical Entomology 3(2,3)

860 Insect Pest Management 3(3,0)

861 Insect Toxicology 3(2,3)

863 Special Problems in Entomology 1-3(0,3-9)

870 Advanced Insect Physiology 3(2,3)

891 Masters' Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

ENVIRONMENTAL SCIENCE (ENSC)

Professors: A. R. Abernathy, R. F. Borgman, R. O. Hegg, W. P. Williams, Jr.

431, 631 Public Health Administration 3(3,0) A course designed to prepare one for a career in the environmental sciences, with positions in public health and pollution control. Topics included are public health organizations and regulations, public relations, psychology of public health administration, and the use of the communications media in educating the public on health problems.

432 Inspection Methods in Water and Solid Waste 3(2,3) Methods of disposal of liquid and solid wastes will be emphasized in regard to environmental quality control. Treatment plant methods will be discussed. Inspection techniques for adequate treatment is a basic approach.

471, 671 Man and His Environment 2(2,0) The interaction of man with his environment will be surveyed. Factors such as urbanization, population growth, pathogens, disease vectors, ionizing radiation, sewage disposal, and noise control will be considered. The effects of environmental contacts with air, water, food, and solid and liquid wastes will be emphasized. *Preq:* Consent of instructor.

472, 672 Environmental Planning and Control 2(2,0) Application of planning and control to effective environmental quality improvement. Water supply and treatment, wastewater treatment and disposal, solid waste disposal, air pollution abatement, and land use and zoning will be considered from the standpoint of control. Not intended for graduate students in engineering. *Preq:* Consent of instructor.

ENVIRONMENTAL SYSTEMS ENGINEERING (ESE)

Professors: A. R. Abernathy, B. C. Dysart III, C. P. Grady, Jr., J. C. Jennett, T. M. Keinath, *Head;* L. G. Rich; *Associate Professors:* A. W. Elzerman, R. A. Fjeld, T. J. Overcamp; *Adjunct Assistant Professor:* H. A. San

401, 601 Environmental Engineering 3(3,0) An introduction to the field of environmental engineering. Topics include environmental phenomena, impact of pollutants in the aquatic environment, solid-waste management, air pollution control, radiological health, and simple water treatment systems. *Preq:* Junior standing in engineering or consent of instructor.

402, 602 Water and Waste-Treatment Systems 3(3,0) A study of the fundamental principles, rational design considerations, and operational procedures of the unit operations and processes employed in water and waste treatment. Both physiochemical and biological treatment techniques will be discussed. An introduction to the integration of unit operations and processes into water and waste treatment systems. *Preq:* EM 320 or consent of instructor.

430, 630 Air Pollution Engineering 3(3,0) An introductory course in air pollution and its control. Topics include air pollutants and effects, sources, dispersion models, engineering controls, and air quality legislation. *Preq:* Senior standing in engineering or physical sciences.

470, 670 Water Resources Engineering 3(3,0) Covers range of water resources development with emphasis on engineering aspects of traditionally important purposes of flood control, navigation, hydroelectric power, and reclamation. Stresses comprehensive, multiple purpose, and systems aspects of modern water resources development and management. Includes introduction to use of mathematical modeling and digital simulation in water resources planning and project design.

491 Selected Topics in Environmental Engineering 1-3 A study of the dynamic role of environmental engineering in maintaining environmental quality. A comprehensive study of any phase of environmental engineering. *Preq:* Consent of department head.

701 Special Problems 1-6(1-6,0)

802 Environmental Engineering Principles 3(3,0)

803 Physicochemical Operations in Water and Wastewater Treatment Systems 4(4,0)

04 Biochemical Operations in Wastewater Treatment Systems 3(3,0)
05 Laboratory in Water and Wastewater Treatment Operations 1(0,4)
06 Integrated Design of Water and Wastewater Treatment Systems 3(3,0)
10 Environmental Radiation Protection I 3(3,0)
11 Environmental Radiation Protection Laboratory I 1(0,3)
12 Environmental Nuclear Engineering 3(3,0)
13 Environmental Radiation Protection Laboratory II 1(0,3)
31 Air Quality Monitoring 3(2,3)
32 Air Pollution Meteorology 3(3,0)
33 Air Pollution Control Systems 3(3,0)
43 Environmental Engineering Chemistry 3(3,0)
44 Environmental Engineering Chemistry Laboratory 2(1,3)
47 Advanced Topics in Environmental Engineering Chemistry 3(3,0)
49 Environmental Engineering Chemistry Laboratory 2(0,6)
50 Stream and Estuarine Analysis 3(3,0)
51 Biological Principles of Environmental Engineering 3(3,0)
52 Ecological Models 3(2,3)
56 Pollution of the Aquatic Environment 3(3,0)
57 Pollution of the Aquatic Environment Laboratory 1(0,3)
61 Environmental Systems Engineering Seminar 0-1(1,0)
62 Environmental Quality Case Study 1(0,3)
75 Water Resources Planning 3(3,0)
76 Water Resources Systems 3(3,0)
81 Special Problems 1-4
83 Selected Topics in Environmental Engineering 1-4
84 Selected Topics in Environmental Engineering 1-4
91 Master's Research. Credit to be arranged.
91 Doctoral Research. Credit to be arranged.

EXPERIMENTAL STATISTICS (EXST)

Professors: P. M. Burrows, W. P. Byrd, J. S. Lytle; *Associate Professors:* L. W. Grimes, H. S. Hill, Jr.; *Instructors:* E. L. Suarez, J. E. Toler

301 Introductory Statistics 3(2,2)F, S Basic concepts and methods of statistical inference; organization and presentation of data, elementary probability, measures of central tendency and variation, tests of significance, sampling, simple linear regression and correlation. The role of statistics in interpreting research, and the general application of the methods are stressed.

462, 662 Statistics Applied to Economics 3(3,0)F Continuation of EXST 301 with emphasis on statistical methods used in the collection, analysis, presentation and interpretation of economic data. Special attention is given to time series analysis, the construction of index numbers and the designing of samples for surveys in the social science fields. *Preq:* EXST 301.

801 Statistical Methods 4(3,3)
803 Regression and Least Squares Analysis 3(3,0)
804 Sampling 3(3,0)
805 Design and Analysis of Experiments 3(3,0)

FINANCE (FIN)

Professor: J. R. Davis, *Acting Head; Associate Professors:* R. H. Klein, R. B. McElreath, Jr. C. D. Wiggins, B. P. Woodside III; *Assistant Professors:* E. J. Ferreira, G. S. Sirmans

101 (ACCT) Accounting and Finance Orientation 1(1,0) See ACCT 101.

304 (ECON) Risk and Insurance 3(3,0) Studies the nature of risk and the role of insurance in risk management from individual and business viewpoints. Topics include probability, theory of the firm under uncertainity, insurance carriers and contracts, underwriting, and regulation. *Preq:* ECON 200, 211, or consent of instructor.

305 (ECON) Investment Analysis 3(3,0) A study of techniques useful in analyzing alternative investment opportunities with emphasis on corporate securities. Investment planning and portfolio management are considered. *Preq:* ECON 211, 212, or consent of instructor.

306, H306 Corporation Finance 3(3,0) The organization and operation of corporations with emphasis on the nature and influences of the various sources of funds. *Preq:* ACCT 202 or equivalent with consent of instructor.

307 Principles of Real Estate 3(3,0) A course to acquaint the student with the theories, practices and principles which govern real estate markets. Major emphasis will be placed on three areas: (1) specifics of real estate brokerage, property rights and ownership; (2) making real estate investment decisions; and (3) financing real estate investments. *Preq:* FIN 306, or 311 or consent of instructor.

308 Financial Institutions and Markets 3(3,0) A study of financial institutions and markets with emphasis upon the role of financing American industry. *Preq:* ECON 302, FIN 306 or 311.

310 Problems in Financial Management 3(3,0) A thorough investigation of the problems and problem-solving techniques often encountered by financial managers. Extensive use is made of the case method of instruction. *Preq:* FIN 306.

311 Financial Management I 3(3,0) First of a two-course sequence designed to provide indepth exposure to the theory and practice of corporate financial management and to demonstrate how financial management techniques are applied in decision-making. Credit cannot be received for both FIN 306 and 311. *Preq:* ACCT 202 and MTHSC 203 or 301.

312 Financial Management II 3(3,0) Continuation of the two-course sequence that begins with FIN 311. *Preq:* FIN 311.

402, 602 Asset Management 3(3,0) A study of the decision process and analytical techniques used in evaluating corporate investment decisions, including both long-term capital investments and working capital management. Computer-based financial decision making will be used. *Preq:* FIN 306 or 312 or consent of instructor.

404 Capital Structure 3(3,0) An examination of the theory and practice of capital structure management and the financing of business concerns. *Preq:* FIN 310 or 312.

406, 606 Portfolio Management and Theory 3(3,0) A study of portfolio theory and management. Capital market theory and performance evaluation measures are examined. Computer applications and case problems in portfolio management are considered as well. *Preq:* FIN 306 or 312, or consent of instructor.

408 Management of Financial Institutions 3(3,0) Detailed study of the operational, marketing, and regulatory aspects of the management of depository financial institutions. Emphasis will be placed on decision making through the extensive use of cases. *Preq:* FIN 308.

410 Research in Finance 1-3 A directed research course for students interested in a career in finance. Research topic selected by student and approved by instructor. A formal research paper is required. *Preq:* FIN 306 or 312 and consent of instructor.

FOOD SCIENCE (FDSC)

Professors: J. C. Acton, R. Aneja, C. V. Morr, W. P. Williams, Jr., *Head; Associate Professor:* J. A. Collins; *Assistant Professors:* L. S. Donnelly, M. E. Kunkel

01 Epochs in Man's Struggle for Food 1(1,0) A study of significant developments in food preservation methods and the impact each had on man's struggle for food.

201 Man and His Food 2(2,0) A study of food and food products with emphasis on nutrients, nutrient needs, and the relationship between nutrient intake and health. Also discussed are food additives, nutritional awareness (to include nutrition labeling), product development, food protection, food resources, and the influence of processing on nutritional quality of food.

202 Introduction to Packaging 2(2,0) An introduction to the technological concepts involved in creating a package and its basic functions. Closure and sealing materials and methods, packaging and labeling laws, ecological impacts, and future of packaging are identified.

212 Man's Food Resources 2(2,0) Food material resources with reference to quality preservation, processing, and nutritional requirements. The role of science and technology in the modern food industry is emphasized. The need for food standards and grades is explained, and the functions of regulatory agencies are discussed.

305, H305 Dairy and Food Engineering 3(2,3) A study of the basic engineering principles and their application to the dairy and food processing operations. The relationship between engineering principles and fundamentals of food processing is emphasized. Topics include material and energy balance, electricity, steam, refrigeration, heat transfer, fluid mechanics, evaporation, water and waste treatment.

401, H401, 601 Food Chemistry I 4(3,3) The basic composition, structure, and properties of food and the chemistry of changes occurring during processing utilization. *Preq:* BIOCH 210 or consent of instructor.

402, H402, 602 Food Chemistry II 4(3,3) Application of theory and procedures for quantitative and qualitative analysis of food ingredients and food products. Methods for protein, moisture, lipid, carbohydrate, ash, fiber, rancidity, color and vitamin analyses and tests for functional properties of ingredients are examined. *Preq:* BIOCH 210 or consent of instructor.

403, 603 Food Preservation and Processing I 3(3,0) Food preservation and processing by refrigerated and frozen storage, thermal processing and pasteurization, dehydration and concentration, fermentation, radiation, microwave heating and chemical preservatives. *Preq:* Physics and organic chemistry or biochemistry.

404, 604 Food Preservation and Processing II 3(3,0) Principles of food preservation applied to flow processes, ingredient functions, and the importance of composition and physical characteristics of foods related to their processing. Product recalls and product development concepts. *Preq:* Physics and organic chemistry or biochemistry.

405, 605 Food Preservation and Processing Laboratory I 1(0,3) Laboratory exercises on preservation methods, equipment utilized, and processes followed in food manufacture. *Coreq:* FDSC 403.

406, 606 Food Preservation and Processing Laboratory II 1(0,3) Continuation of FDSC 405 with greater emphasis on processes followed in food manufacture. *Coreq:* FDSC 404.

417 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

418 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

420, H420 Special Topics in Food Science 1-3(1-3,0) Comprehensive study of special topics in food science not covered in detail or contained in other courses. Contemporary developments in each topic area will be stressed. Maximum of 3 credits may be taken. *Preq:* Consent of instructor.

421, H421 Special Problems in Food Science 1-3(0,3-9) Independent research investigation in food science related to processing, preservation, packaging, or nutritional aspects of foods. Special emphasis will be placed on organizing a research proposal, conducting the research, and reporting of findings. Maximum of 3 credits may be taken. *Preq:* Senior standing and consent of instructor.

422, 622 Quality Assurance and Sensory Evaluation 2(2,0) Principles of food quality assurance programs with emphasis on the elements of sensory evaluation testing, sampling, inspections, federal and trade standards/grades, records and EVOP procedures.

424, 624 Quality Assurance and Sensory Evaluation Laboratory 1(0,3) Continuation of FDSC 422. The mechanics of quality assurance laboratory methods with emphasis on sensory evaluation panel testing, scoring, kinesthetic properties, and grade-quality measurements.

464, 664 Food Packaging Systems 3(3,0) Characteristics and application of various materials and systems used in the packaging of foods. Engineering properties of the materials and methods used to measure such properties are emphasized. Consideration is given to packaging systems for specific food applications. *Preq:* Consent of instructor.

466, 666 Food Packaging Systems Laboratory 1(0,3) Laboratory and field exercises on food packaging operations and packaging materials. Methods to evaluate the physical and chemical properties of packaging materials will be emphasized. *Preq:* Consent of instrutor.

491 Practicum 1-4 Supervised experiential opportunities in the food industry. *Preq:* Junior standing and consent of department head.

802 Food Enzymology 2(2,0)

803 Food Fermentations 2(2,0)

804 Thermal Processing of Packaged Foods 3(3,0)

805 Food Rheology 2(2,0)

806 Chemistry of Food Colors and Pigments 2(2,0)

807 Food Colloids 2(2,0)

808 Food Flavors 2(2,0)

820 Special Topics in Food Science 1-3(1-3,0)

821 Special Problems in Food Science 1-3(0,3-9)

851 Food Science Seminar 1(1,0)

852 Food Science Seminar 1(1,0)

891 Master's Research. Credit to be arranged.

FORESTRY (FOR)

Professors: R. M. Allen, B. H. Box, B. M. Cool, D. D. Hook, G. D. Kessler, C. L. Lane, W. H. D. McGregor, R. E. Schoenike, W. A. Shain, M. A. Taras, *Head;* D. H. Van Lear, G. W. Wood, T. E. Wooten, R. Zahner; *Associate Professors:* J. B. Cody, B. A. Dunn, D. C. Guynn, Jr., D. L. Ham, R. L. Hedden, L. E. Nix, L. D. Reamer, G. E. Sabin, F. H. Tainter; *Assistant Professors:* G. R. Askew, Jr., C. A. Gresham, R. A. Harris, A. W. Lee, A. P. Marsinko, A. E. Miller, K. F. Ray, A. T. Shearin, T. M. Williams; *Instructors:* J. L. Haymond, S. K. Nodine

101 Introduction to Forestry 1(1,0)F An informative sketch of forestry, forests, and forestry tasks of the nation; education and career opportunities for foresters.

102 Introduction to Forestry 1(1,0)S Continuation of FOR 101.

205 Dendrology 4(3,3)F Classification, nomenclature, and identification of the principal forest trees of the United States, their geographical distribution, ecological requirements, and economic importance. Field identification of native trees and commonly planted exotics in the Piedmont and surrounding areas. *Preq:* BIOL 103, 105 or consent of instructor.

206 Silvics 4(3,3)S A study of the nature of forests and forest trees, how they grow, reproduce, and their relationships to the physical and biological environment. *Preq:* AGRON 202, BIOL 103 and 105, FOR 205 or consent of instructor.

221 Wood Properties I 3(2,3)F The formation of wood in forest trees, gross and minute characteristics of wood, defects in wood, variability in wood. *Preq:* BIOL 103, 105 or consent of instructor.

222 Wood Properties II 3(2,3)S Wood in relation to moisture, heat, sound, light, and electricity; mechanical properties of wood; standard testing procedures for wood. *Preq:* FOR 221 or consent of instructor.

251 Forest Plants 1(Summer Camp) Identification of principal native forest understory plants by vegetative and floral characteristics; their site requirements and forest-type associations with emphasis on successional patterns; and their value for man and wildlife. The preparation of a field herbarium is required of all students. *Preq:* BIOL 103 and 105, FOR 205 or consent of instructor.

252 Forest Engineering 2(Summer Camp) Field and drafting practice in mapping, traversing boundaries, and road location; use of surveying equipment and techniques. *Preq:* CE 201, EG 105 or consent of instructor.

253 Forest Mensuration 4(Summer Camp) Practical application of field techniques including timber cruising, measuring tree heights and volumes, constructing volume tables and boundary line surveys. *Preq:* CE 201, EG 105, FOR 205 or consent of instructor.

254 Forest Products 1(Summer Camp) A tour of the forest products industry of South Carolina with an emphasis on those products and processes of some distinction or special interest.

255 Secondary Wood Products 1(Summer Camp) A tour of the secondary wood products industries with an emphasis on industries too far from Clemson for the usual half-day field trips during regular sessions. *Preq:* FOR 205 or consent of instructor.

256 Forest Operations 1(Summer Camp) Field observations of selected methods and equipment used to establish, maintain, and harvest forest stands. *Preq:* Consent of instructor.

301 Forest Entomology 3(2,3)F Insects of economic importance to forests, forest products and shade trees, and their role in the practice of good forest management as well as their significance in the natural environment. *Preq:* FOR 205, 206, or consent of instructor.

302, 602 Forest Mensuration 3(2,3)S A practical application of statistical and mensurational techniques in forest management. *Preq:* EXST 301, FOR 253 or consent of instructor.

304, 604 Forest Economics 3(3,0)S Economic problems and principles involved in the utilization of forest land and timber and in the distribution of forest products; cost analysis of integrated forest operations. *Preq:* ECON 212, MTHSC 106, or consent of instructor.

305 Elements of Forestry 2(2,0)F, S A compendium of forestry subjects providing a broad view of the forest environment as it relates to ecology, management and utilization of forests, especially those of South Carolina. Not open to Forest Management majors. *Preq:* BIOL 103 and 105 or consent of instructor.

306, 606 Wood and Wood Fiber Identification 2(1,3)S Macroscopic and microscopic identification, properties, and uses of selected economically significant timbers. *Preq:* BIOL 103 and 105, or consent of instructor.

307 Elements of Forestry Laboratory 1(0,3)F, S Field and laboratory exercises in the fundamentals of forest land management considered in FOR 305. *Preq:* Registration in FOR 305.

308, 608 Aerial Photographs in Forestry 3(2,3)F An introduction to photographic measurements, aerial photo-interpretations, mapping, and timber estimating. *Preq:* CE 201, Forestry Summer Camp, or consent of instructor.

310, 610 Silviculture 4(3,3)S Theory and practice of establishing, maintaining, and harvesting forest stands in accordance with ecological and economic principles. *Preq:* FOR 206, Forestry Summer Camp, or consent of instructor.

312 Reproduction of Forest Trees 2(1,3)S, Odd-numbered years. Methods of reproduction in forest trees; seed propagation, propagation by rooting and grafting techniques; environmental requirements for propagation, media, and materials. The course covers theory and practical instruction, making use of indoor and outdoor propagating beds. Limited enrollment. *Preq:* FOR 205 or consent of instructor.

315 Forest Ecology 2(2,0)S A study of the forest ecosystem stressing the interrelationships between the living and nonliving components of the forest environment. Energy flow, nutrient and hydrologic cycles, meteorological and soil factors will also be considered. Not open to Forestry majors.

325 Wood Chemistry 3(2,3)F The chemistry of the major components of wood, distribution of th wall components in wood, chemical processing of wood, and cellulose-derived products. *Preq:* CI 102 or consent of instructor.

327 Wood Processing I 3(2,3)F Wood seasoning principles and practices, seasoning defects, woo preservation principles and practices, fire-retardant treatments. *Preq:* FOR 221 or consetnt o instructor.

328 Wood Processing II 3(2,3)S Machining and preparation of wood for processing, woo adhesives, wood finishes. *Preq:* FOR 327 or consent of instructor.

401, 601 Harvesting Forest Products I 2(1,3)F Harvesting methods and costs. Major emphasis o survey of logging methods and equipment. *Preq:* Senior standing or consent of instructor.

403, 603 Forest Soils Seminar 1(1,0)S A study of forest soil characteristics with respect to sit evaluation, forest fertilization, planting problems, watershed management, tree-soil-microorganisn interactions, and trafficability. *Preq:* Junior standing or consent of instructor.

405, 605 Forest Influences 2(2,0)F An examination of the effect of forests and forestry on climate water, soil, organisms, and humans. Reviews forest influences in relation to current environmenta legislation and debate. *Preq:* FOR 206 or consent of instructor.

407, 607 Forest Pathology 3(2,3)F Nature and control of disease of forest trees and their products Will focus upon the relation of disease control to silviculture, management, and forest product utilization. *Preq:* FOR 310 or consent of instructor.

409, 609 Multiple-Use Forestry 3(3,0)S A study of the demand placed on forests for a variety o products and uses, and how these can and must be reconciled in planning the management o each forest. *Preq:* Senior standing or consent of instructor.

411, 611 Harvesting Forest Products II 3(2,3)S An application of engineering and cost analysis techniques to the evaluation of the forest transport system and various harvesting situations. *Preq:* FOR 401 or consent of instructor.

412, 612 Forest Protection 2(2,0)S Prevention and suppression of forest fires; their effect upon the environment and people; factors affecting fire behavior; and use of fire in resource management. *Preq:* Senior standing or consent of instructor.

414, 614 Forest Management Plans 3(1,6) Analysis of factors entering into forest working plans of several forestry organizations; preparation of a preliminary management plan of a sample area. *Preq:* FOR 417.

415, 615 Forest Wildlife Management 3(2,3)F Principles, practices, and problems of wildlife management with emphasis on upland forest game species. Habitat manipulation through use of appropriate silvicultural practices in association with other techniques are evaluated. *Preq:* FOR 310 or consent of instructor.

416, 616 Forest Policy and Administration 2(2,0)S Development, principles, and legal provisions of forest policy in the United States. Administrative and executive management in forestry. *Preq:* Senior standing or consent of instructor.

417, 617 Forest Management and Regulation 4(3,3)F Correlation of production factors and yields of forests; regulation of cuts and growing stock in sustained yield management. *Preq:* Forestry Summer Camp, FOR 304, 310 or consent of instructor.

418, 618 Forest Valuation 3(3,0)S Capital investments in forestry and the returns derivable from them; valuation of land, timber, and other resources associated with forestry; appraisal of damage and stumpage values. *Preq:* FOR 304 or consent of instructor.

419 Senior Problems 3(1-3,0) Problems chosen with faculty approval in selected areas of forestry. *Preq:* Senior standing.

420, 620 Forest Products 3(2,3)F Primary forest products including lumber, poles and piles, veneers and plywoods, secondary wood products; chemically derived products from wood including pulp

and paper, distillation products, wood hydrolysis; miscellaneous and minor forest products. *Preq:* FOR 306, Forestry Summer Camp, or consent of instructor.

421, 621 Biology and Silviculture of Hardwood Forests 2(1,2) Study of the silvics, growth, and development of major hardwood species of North America that will relate these biological characteristics to the ecology, silviculture, and utilization of the hardwood forests of the Eastern United States. *Preq:* FOR 205, 206, 306, 310, or consent of instructor.

423, 623 Lectures in Forestry 2-4(2-4,0-3) Lectures in various fields of forestry delivered by the holders of the Visiting Professorship in Forestry.

424, 624 Forest Genetics and Tree Breeding 3(3,0)S, Even-numbered years. History of genetics and breeding in forestry and its relation to silviculture; natural variation, hybridization and inheritance in forest trees; tree breeding objectives and methods. *Preq:* GEN 302 or equivalent, or consent of instructor.

429, 629 Wood Design 3(2,3)F The technical mechanical properties of wood; load analysis and design criteria; design of structural elements in wood. *Preq:* FOR 328 or consent of instructor.

430, 630 Composite Wood Materials 3(2,3)S Manufacturing methods, physical and mechanical properties, and uses of wood-polymer composites, wood laminates, plywood, particleboard, fiberboard, reconstituted board products, structural sandwich panels, paper-base plastic laminates, and extruded and molded products. *Preq:* FOR 222, 328, or consent of instructor.

431, 631 Recreation Resource Planning in Forest Management 3(3,0)S, Odd-numbered years. Analysis of forest recreation as a component of multiple-use forest management; techniques of planning; physical and biological effects on forest environments; and forest site, user, and facility management.

432, 632 Forest Site Capability 2(2,0)S Analysis of use pressures on the forest land base and their effects on the capability of the forest to satisfy resource demands. Productivity and sensitivity of sites will be discussed. *Preq:* Senior standing in Forestry or consent of instructor.

433, 633 Merchandising of Forest Products 3(3,0)S Merchandising practices employed in the forest products industries, emphasizing the lumber and pulp and paper industries. *Preq:* ECON 211, FOR 304, or consent of instructor.

434, 634 Foreign Woods and Their Properties 2(1,3)S The identification of commercially important foreign woods imported into the United States, their macroscopic and microscopic features, basic wood properties, and use. *Preq:* FOR 221, 306, consent of instructor.

435, 635 Park and Forest Structures 2(2,0)F Selection, processing, protection, and maintenance of wood used in park and forest structures. *Preq:* Senior standing or consent of instructor.

436, 636 Wood as an Energy Source 2(2,0)S A study of the availability, characteristics, and processing required for using wood and bark as a source of energy. *Preq:* Senior standing or consent of instructor.

707 Special Problems 1-3(1-3,0)

801 Data Processing in Forestry Problems 3(2,3)

802 Advanced Mensuration 3(2,3)

803 Photo Interpretation 3(2,3)

804 Advanced Forest Economics 3(2,3)

805 Advanced Silviculture I—Forest Soils 3(3,0)

806 Advanced Silviculture II—Forest Tree Growth and Development 3(3,0)

807 Special Problems in Forestry. Credit to be arranged.

808 Seminar 1(1,0)

809 Products Biodeterioration 3(2,3)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

FRENCH (FR)

Professors: R. R. McGregor, Jr., H. E. Stewart, *Head; Associate Professors:* J. M. Melton, J. B. Romeiser; *Assistant Professors:* D. Y. Brannock, Jr., D. J. Calvez, M. Cranston, P. R. Heusinkvelt, S. C. King, J. A. McNatt, J. B. Macy; *Instructor:* R. Willingham; *Adjunct Visiting Instructor:* R. Stirn

101, H101 Elementary French 4(3,1) A course for beginners in which, through conversation, composition, and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

102, H102 Elementary French 4(3,1) Continuation of FR 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

196 Practicum in French 1(0,1) An on-campus program of teaching foreign languages to children. Students work under the supervision of faculty in planning and teaching one 45-minute class per week to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year language standing or consent of department head.

198 Situational French 4(3,2) An intensive course relating to a student's field of study. Designed primarily for non-Liberal Arts majors preparing for employment or study abroad. Subsequent placement into FR 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements.

199 Situational French 4(3,2) Continuation of FR 198. Subsequent placement into FR 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements. *Preq:* FR 198 or consent of instructor.

201, H201 Intermediate French 3(3,0) A brief review of FR 101 and 102, with conversation, composition, and dictation, and the reading of more serious short prose pieces in French. *Preq:* FR 102.

202, H202 Intermediate French 3(3,0) While attention is paid to writing and speaking French, more stress is laid on the rapid reading of more difficult French prose than in the earlier courses. *Preq:* FR 201.

205 Elementary French Conversation and Composition 3(3,0) Intensive oral and written training in French through conversation groups, speeches, written composition, and controlled vocabulary acquisition. Required of all French majors and minors. May be taken concurrently with FR 202, 301 or 302. *Preq:* FR 201.

209 Introduction to French Phonetics 3(3,0) A study of the fundamental principles of the pronunciation of French through the use of the International Phonetic Alphabet and recordings. This course may not be used toward the satisfaction of the foreign language requirement in the Bachelor of Arts curriculum. *Preq:* FR 201 or equivalent.

299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credit hours. *Preq:* Consent of instructor directing the play.

301 Survey of French Literature I 3(3,0) French literary movements and authors of the 19th and 20th centuries. *Preq:* FR 202.

302 Survey of French Literature II 3(3,0) French literary movements and authors from the Middle Ages through the 18th century. *Preq:* FR 202.

305 Intermediate French Conservation and Composition I 3(3,0) Practice in the spoken language, with stress on vocabulary building, pronunciation, intonation, and comprehension; written work to increase accuracy. Assignments in the language laboratory. *Preq:* FR 202 or consent of department head.

306 Intermediate French Conversation and Composition II 3(3,0) Continuation of FR 305, with additional emphasis on written composition. *Preq:* FR 305 or consent of department head.

307 French Civilization 3(3,0) A study of the significant aspects of the culture of France from its origins to the present. *Preq:* FR 202, and 205 or consent of department head.

310 French for Business and Industry 3(3,0) An introduction to the language of French business and industry, with emphasis upon writing and translating business letters and professional reports. Preparation toward the examination for the Certificat Pratique de Francais Commercial. *Preq:* FR 202 or consent of department head.

398 Directed Reading 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department head.

403 Twentieth Century French Prose and Poetry 3(3,0) The major literary themes and genres of the period and their influence upon other art forms. *Preq:* FR 301 or 302.

404 Twentieth Century French Drama 3(3,0) A survey of French drama and its relationship to other literary and art forms. *Preq:* FR 301 or 302.

405 Nineteenth Century French Romanticism 3(3,0) The Romantic movement as expressed in the works of its principal exponents during the century. *Preq:* FR 301 or 302.

406 Nineteenth Century French Literary Movements 3(3,0) A study of genres representative of the literary theories which contributed to the great diversity of the literature, painting, and music of the period. *Preq:* FR 301 or 302.

407 Eighteenth Century French Literature 3(3,0) The principal literary figures of the 18th century, with particular emphasis on Voltaire and Rousseau. *Preq:* FR 301 or 302.

408 Seventeenth Century French Literature 3(3,0) Major literary figures, themes, and forms of 17th century French literature. *Preq:* FR 301 or 302.

409 Advanced Grammar and Conversation 3(3,0) An intensive study of syntax and stylistics through composition and translations. *Preq:* Senior standing or consent of department head.

498 Independent Study 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department head.

499 Selected Topics in French Literature 3(3,0) Selected topics that have characterized French literature, language, and culture throughout the centuries. May be repeated for a maximum of six credits. *Preq:* FR 301 or 302.

GENETICS (GEN)

Professors: P. M. Burrows, G. R. Craddock, W. D. Graham, Jr., E. A. Rupert; *Associate Professors:* R. H. Hilderman, E. L. Kline, J. S. Rice, D. G. Yardley; *Assistant Professors:* E. R. Shipe, S. U. Wallace

301 Genetics and Human Affairs 3(3,0)S, SS Basic genetic principles emphasizing human heredity and the relationship of genetics to society. Discussion of chromosome abnormalities, inborn errors of metabolism, sex-related traits, genetic counseling, and other current genetic topics. Course is designed as an elective for students in nonbiological science majors. Will not substitute for GEN 302.

302, H302, 602 Genetics 4(3,3)F, S, SS A basic course dealing with the fundamental principles of inheritance in prokaryotes and eukaryotes. Emphasis is given to Mendelian genetics, physical and chemical bases of heredity, inherited human abnormalities, population genetics and other facets of heredity. *Preq:* BIOL 103, 104, 105, 106, or consent of instructor.

305 Introductory and Molecular Genetics 3(3,0) A molecular approach to Mendelian genetics built upon the biochemical-molecular principles presented in BIOCH 301. Additional emphasis is placed on prokaryote genetics and eukaryote chromosome structure and regulation. *Preq:* BIOCH 301.

306 Introductory and Molecular Genetics Laboratory 1(0,3) A laboratory to give students experience in genetic techniques used in both classical and modern genetics. Exercises are designed to emphasize principles taught in GEN 305. *Coreq:* GEN 305.

451, 651 Advanced Genetics 3(3,0)S Advanced study of the principles of general genetics. Topics emphasized are variations in chromosome number and structure, natural and induced mutations,

extranuclear inheritance, recombination, control of gene activity, genes and development, genetics of behavior patterns, population genetics, systems of mating, genetics and man. *Preq:* GEN 302 or equivalent.

701 Modern Development in Genetics 3(3,0)

801 Cytogenetics 3(2,3)

803 Biometrical Genetics 3(3,0)

806 Special Problems in Genetics 1-3(0,3-9)

890 Special Topics in Genetics 1-3(1-3,0)

GEOGRAPHY (GEOG)

Assistant Professor: J. A. Miller

101 Introduction to Geography 3(3,0) An introduction to the tools, language, methodologies, and basic concepts of geography as a social science.

102 Human Geography 3(3,0) Introduction to modern geography as the study of environment, population, resources, and technology. Emphasis is placed on the human impact on natural systems of air, water, and land.

301 Political Geography 3(3,0) The geographic basis for and the geographical problems of the modern state; the relevance of geographical patterns of international affairs. *Preq:* GEOG 101.

302 Economic Geography 3(3,0) The geographic conditions fundamental to the world's resources (agricultural, mineral, commercial, and industrial), and the conditions which affect the utilization, marketing, consumption, and strategic significance of those resources. *Preq:* GEOG 101.

303 Urban Geography 3(3,0) Geographic survey of urban structures and environment. Topics include definitions of cities and urban characteristics, geography of cities in world history, contemporary city, urban land use, and social geography. Fieldwork in the South Carolina urban environment is required and culminates in a problem-oriented class project.

GEOLOGY (GEOL)

Professors: P. K. Birkhead, V. S. Griffin, Jr., G. M. Haselton, D. S. Snipes; *Assistant Professor:* R. D. Warner; *Instructor:* J. R. Wagner; *Lecturer:* J. G. Stillwell

101 Physical Geology 4(3,2) A study of the minerals and rock which compose the earth's crust, their origins and transformations. Emphasis is placed upon geological processes, both internal and external, by which changes are produced on or in the earth. Laboratory instruction is provided in the interpretation of geologic processes through study of topographic maps. Field trips provide direct observation of processes and results.

102 Historical Geology 4(3,3) Evolution, both organic and inorganic, is traced from the beginning of the record through the present. Laboratory instruction and field trips provide practice in the identification and study of plants and animals which have left their record as fossils in the rock of the earth's crust. *Preq:* GEOL 101.

219 Geology for Foresters 3(3,0) A study of materials of the earth's crust, processes of their origin and change; landforms, processes of their formation and destruction. Demonstration of materials is fully incorporated into lectures. Limited to students majoring in Forest Management or consent of instructor.

306, 606 Mineralogy 3(2,3) The student gains a working knowledge of crystallography and a comprehensive knowledge of determinative mineralogy. Identification of the minerals is based on their physical and chemical properties. *Preq:* GEOL 101.

309, H309, 609 Petrology 3(2,3) The genesis, evolution and classification of rocks through lectures, laboratory exercises, and field trips. The occurrences, chemical relationships, and distribution of rock types are emphasized. *Preq:* GEOL 306.

310, H310, 610 Optical Mineralogy 3(1,5) The purpose of this course is to enable the student to identify minerals under the microscope on the basis of their optical properties. *Preq:* GEOL 306.

313, 613 Stratigraphy and Sedimentation 3(3,0) The process by which sediments are eroded, transported, and deposited (sedimentation), with major emphasis on relationships of the age and time distribution of stratified rocks and their historical significances (stratigraphy). *Preq:* GEOL 101.

400, 600 Environmental Geology 3(3,0) A discussion-oriented introductory study of the relationships of man to his physical surroundings and the problems resulting from upsetting the established equilibria of geologic systems; man's role as a geologic agent, environmental conservation and management.

402, H402, 602 Structural Geology 3(2,2) The diverse geological structures of the earth, their description, origin, and field recognition. Practical problems in interpreting geologic structures are utilized, in addition to theoretical considerations of the mechanics and causes of tectonism. *Preq:* GEOL 101.

403, H403, 603 Invertebrate Paleontology 3(2,3) A study of life of past geologic ages, as shown by fossilized remains of ancient animals, with emphasis on the invertebrates. *Preq:* GEOL 101 or consent of instructor.

404, H404, 604 Economic Geology 3(3,0) This course concerns the description and classification of ore deposits and commercial nonmetallic mineral deposits. The origin of mineral deposits and their occurrence is emphasized. Problem studies and field trips to nearby mines and quarries. *Preq:* GEOL 306.

405, 605 Geomorphology 4(3,3) A study of the surface features of the earth—their form, nature, origin, development, and the change they are undergoing. *Preq:* GEOL 101, 102, or consent of instructor.

407, 607 Quaternary Geology 3(2,2) Early concepts about glaciation. Types and distribution of glaciers today and during their maximum extent. Glacial erosion, transportation and ice-sculptured terrain features. Study of quaternary sediments and their chronology. Drainage changes, sea level fluctuations and crustal deformation. Detailed study of specific areas as time permits. Field trips.

408, 608 Geohydrology 3(3,0) Study of the hydrologic cycle, aquifer characteristics, theory of groundwater movement, mechanics of well flow, experimental methods, and subsurface mapping. *Preq:* GEOL 101, 102

411, 611 Research Problems 1-3(0,3-9) A field, laboratory, or library study of an approved topic in geology. Topic would be one not normally covered in formal courses, but may be an extension of a course. Taught either semester and may be taken more than once for a maximum of 6 credits. *Preq:* Senior standing in Geology or consent of instructor.

451 Seminar in Geology 1(1,0)S A survey of the current literature and ideas of geology through library research and preparation of a seminar lecture on a topic by each individual student. *Preq:* Junior stnding.

700 Earth Science 3(2,3)

GERMAN (GER)

Associate Professors: J. M. Melton, M. M. Sinka, P. W. Wannamaker; *Assistant Professor:* E. P. Arnold

101, H101 Elementary German 4(3,1) A course for beginners in which, through conversation, composition and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

102, H102 Elementary German 4(3,1) Continuation of GER 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

196 Practicum in German 1(0,1) An on-campus program of teaching foreign languages to children. Students work under the supervision of faculty in planning and teaching one 45-minute class per week to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year language standing or consent of department head.

198 Situational German 4(3,2) An intensive course relating to a student's field of study. Designed primarily for non-Liberal Arts majors preparing for employment or study abroad. Subsequent placement into GER 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements.

199 Situational German 4(3,2) Continuation of GER 198. Subsequent placement into GER 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements. *Preq:* GER 198 or consent of instructor.

201, H201 Intermediate German 3(3,0) A brief review of GER 101 and 102, with conversation, composition and dictation, and the beginning of more serious reading of German prose in short stories and plays. *Preq:* GER 102.

202, H202 Intermediate German 3(3,0) Emphasis on reading nontechnical German prose more rapidly. Writing, speaking, and listening skills will continue to be developed. *Preq:* GER 201 or consent of department head.

205 Elementary German Conversation and Composition 3(3,0) Intensive oral and written training in German through conversation groups, speeches, written compositions, and controlled vocabulary acquisition. Recommended for all German majors. *Preq:* GER 201. *Coreq:* GER 202, 301 or 302.

251 Scientific German 3(3,0) An alternate course to GER 202, especially for students in the sciences. Readings will be chosen from various fields. Grammar and syntax will be reviewed to ensure accurate translations, but stress will be on reading for understanding. *Preq:* GER 201 or consent of department head.

299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credit hours. *Preq:* Consent of instructor directing the play.

301 Twentieth Century German Drama 3(3,0) Selected works from major German-speaking dramatists of the 20th century, including Brecht, Duerrenmatt, and Frisch. Required of German majors. *Preq:* GER 202 or consent of department head.

302 Twentieth Century German Prose and Poetry 3(3,0) Selected prose and poetry from major 20th century German-speaking authors, including Rilke, Mann, Hesse, Kafka, and Böll. Required of German majors. *Preq:* GER 202 or consent of department head.

305 Intermediate German Conversation and Composition 3(3,0) Practice in the spoken language, with emphasis on vocabulary, pronunciation, and comprehension; written exercises for accuracy. Required of German majors. *Preq:* GER 202, 205, or consent of department head.

307 German Civilization 3(3,0) A study of significant aspects of the culture of the German-speaking peoples from their origins to the present. *Preq:* GER 202 or consent of department head.

398 Directed Reading 1-3(1-3,0) Directed study of selected topics in German literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department head.

401 Studies in German Literature I 3(3,0) Selected topics in German literature from the beginnings to 1832. *Preq:* GER 301, 302, or consent of department head.

402 Studies in German Literature II 3(3,0) A study of selected topics in 19th or 20th century German literature. *Preq:* GER 301, 302, or consent of department head.

403 Studies in German Literature III 3(3,0) A study of a major theme in German literature within a chosen time period or in the work of one major author. The themes may be subject- or genre-oriented. *Preq:* GER 301, 302, or consent of department head.

411 Studies in the German Language I 3(3,0) Advanced training in the spoken and written language with emphasis on vocabulary, syntax, and stylistics. *Preq:* GER 305 or consent of department head.

412 Studies in the German Language II 3(3,0) An indepth study of terminology and syntax for specific subject areas in business, in the liberal arts, and in the sciences. *Preq:* GER 301, 302, 305, or consent of department head.

413 Studies in German Culture 3(3,0) An intensive study of selected topics concerning cultural phenomena of the German-speaking nations. *Preq:* GER 301, 302, 305, or consent of department head.

498 Independent Study 1-3(1-3,0) Supervised study of selected topics in German literature, language, or culture. *Preq:* Consent of department head.

GRADUATE STUDIES (GS)

799 Comprehensive Studies 1-15

GRAPHIC COMMUNICATIONS (GC)

104 Graphic Arts I 3(1,6) Major emphasis is placed on the basic principles underlying the graphic arts. Many areas of study include general photography, graphic layout and design, process photography, offset lithography, screen printing, and bindery. Modern industrial applications are stressed throughout.

207 Graphic Arts II 3(1,6) Continuation of GC 104. An intermediate course for the graphic communications and graphic arts specialists which broadens skills and technical knowledge in areas of layout, copy preparation, reproduction photography, film assembly, screen printing, lithographic presswork, and finishing. *Preq:* GC 104.

304 Photographic Techniques 3(1,6) Emphasis is placed on application of black and white photography as activities for vocation and avocation. Sufficient laboratory experiences are provided to assure confidence in the use of photographic techniques. Problems encountered in action, portrait, still life, and character-study photography are considered.

406, 606 Problems in Specialty Printing 4(2,6) Study of the problems and processes for printing and converting in package label and specialty industries. Laboratory applications include flexographic preparation, printing, and die cutting; die making and die cutting screen and offset printed sheet stock; sublimation and plastisol transfer printing; plastic and metal container printing. *Preq:* GC 104.

440, 640 Advanced Lithographic Methods 4(2,4) Students selecting to pursue the area of graphic arts will gain experience in the development of advanced techniques of layout and design; photographic copy preparation; cold type composition; line, halftone, duotone, and special-effects photography, full color reproduction and advanced platemaking; process stripping, and color offset presswork. *Preq:* GC 207.

444, 644 Current Developments and Trends in Graphic Communications 3(2,3) A study of commercial and industrial printing control. Emphasis is placed upon consideration for decision making in the areas of process and equipment selection and plant layout. Other topics include production flow, cost analysis, and recent developments as they affect production. *Preq:* GC 207.

448, 648 Planning and Controlling Printing Functions 3(3,0) A study of systems for setting printing production standards, estimating, scheduling, job planning, and the selection of new hardware and technologies. *Preq:* GC 440 and/or consent of instructor.

HISTORY (HIST)

Professors: J. L. Arbena, R. S. Lambert, E. M. Lander, Jr., D. M. McKale, J. V. Reel, Jr., A. Schaffer, *Head;* R. A. Waller; *Associate Professors:* R. M. Golden, J. W. Johnson, C. H. Lippy, R. L. Saunders, Jr., W. F. Steirer, Jr.; *Assistant Professors:* E. D. Carney, P. E. Ceruzzi, L. J. Greenspoon, C. A. Grubb, T. J. Kuehn, R. P. Leemhuis, E. E. Moise, R. R. Owens, D. G. Paz; *Visiting Assistant Professor:* M. C. Satre

100 Higher Education and Clemson 1(1,0) An introduction to higher education. Its background and development in the western world, emphasizing land-grant institutions and Clemson University in particular.

101, H101 History of the United States 3(3,0) The political, economic, and social development of the American people from the period of discovery to the end of Reconstruction.

102, H102 History of the United States 3(3,0) The political, economic, and social development of the American people from the end of Reconstruction to the present.

172, H172 Western Civilization 3(3,0) The political, economic, and social movements of Western civilization from ancient times to the seventeenth century.

173, H173 Western Civilization 3(3,0) The political, economic, and social movements of Western Civilization from the seventeenth century to the present.

191 The World in the Twentieth Century 3(3,0) A history of the world in the 20th century which integrates American, European, and non-Western development and traces the historical roots of contemporary issues in politics, economics, international relations, society, culture, and the arts.

198 Current History 1(1,0) An examination of the major events and problem areas in the news with emphasis on their historical context and possible long-range significance. May be taken a total of three times for credit. Does not count toward the requirements of the major or minor in History.

300 History of Colonial America 3(3,0) The development of American institutions and customs in the period before 1776. Considerable emphasis is placed on the imperial relations between Great Britain and her colonies and upon the movement towards and the philosophy of the American Revolution.

301 American Revolution and the New Nation 3(3,0) A study of the various historical explanations leading to an understanding of the American Revolution, the establishment of the Nation under the Constitution, and the first decade of the new nation. Special emphasis will be placed upon developing an understanding of individual motivation and ideological development present during the last four decades of the eighteenth century.

302 Age of Jefferson and Jackson 3(3,0) The formation and growing pains of the new nation through the Federal and Middle periods of its history, with emphasis on economic and political development, the westward movement, and the conflicting forces of nationalism and sectionalism.

303 Civil War and Reconstruction 3(3,0) A study of the political, military, and social aspects of the sectional conflict and of the era of Reconstruction. Some emphasis will be placed on the historical controversies which the period has inspired.

304 Industrialism and the Progressive Era 3(3,0) A study of American society in the period between 1880 and 1930s. This course emphasizes the effects of industrialization and urbanization on the American people.

305 United States Since 1933 3(3,0) Particular emphasis will be given to the Great Depression, World War II, the Cold War, and domestic developments in the 1950s and 1960s.

306 American Economic Development 3(3,0) The economic development of the United States from Colonial to recent times, emphasizing the institutional development of agriculture, banking, business and labor, and government regulations and policy.

307 Recent United States Diplomatic History 3(3,0) The history of American foreign policy from the late nineteenth century to the present, showing the rise of America's world interests and gradual involvement in global affairs. Emphasis is placed on the role of public opinion in foreign policy.

308 American Legal History 3(3,0) A survey of the American legal system in its historical perspective, from Colonial time to the present. Emphasis will be placed on the relationship between law and society, the way in which the practice of law changes American society, and the way in which social development affected both the theory and practice of the law.

309 History of Technology 3(3,0) History of the major developments in Western technology with an emphasis on specific technologies and their relationships to the societies and cultures in which they flourished.

310 American Technology in the Twentieth Century 3(3,0) History of the technologies integral to American life. Through case studies, the origins, development, and impact (past and present) of specific technologies will be examined in depth.

313 History of South Carolina 3(3,0) The political, economic, and social development of South Carolina from 1670 to the present.

314 History of the South 3(3,0) Origins and development of political, economic, and cultural institutions of the South from the Colonial period to the present, and the role of the South in the nation's development.

315 Black History in America 3(3,0) A study of the Afro-American experience in the United States, from the African past, through slavery, to the present.

330 History of Modern China 3(3,0) The growth and development of Chinese civilization from ancient times to the present. Emphasis in the course is on 20th century China, particularly since the rise to power of the Communist regime.

333 History of Modern Japan 3(3,0) The origin and development of Japanese civilization with particular emphasis on modern Japan from mid-19th century to the present.

340 Ancient Americans 3(3,0) An introduction to the geography of the Western Hemisphere; origin of human life in the Americas; structure and accomplishments of the major pre-Columbian societies, with an emphasis on the rise and decline of the Classic civilizations; the impact of the European conquest; the formation of a new Ibero-American culture.

341 Mexico and Middle America Since 1800 3(3,0) An introduction to the geography of the region, origins, and progress of the Independence movements and political, economic and social developments after 1825; current domestic and international problems.

342 South America Since 1800 3(3,0) An introduction to the geography of the region; origins and progress of the Independence movements; political, economic and social developments after 1825; current domestic and international problems.

351 Ancient Near East 3(3,0) A history of the peoples and civilizations of the Near East from the Sumerians to the establishment of Roman power in this region. Geography, mythology, religious and economic currents, as well as the methods and discoveries of archaeology will be included.

354 The Greek World 3(3,0) A study of Greek civilization from its beginning until the time of the Roman conquest, concentrating on the social institutions of the Greek city-states.

355 The Roman World 3(3,0) The rise of Rome to world empire and the international civilization it dominated. Concentration on the nature of the political change from Republic to monarchy with particular emphasis on city life and the causes of its decline.

361 History of England to 1603 3(3,0) The history of England to 1603.

363 History of England Since 1603 3(3,0) Continuation of HIST 361.

370 Medieval History 3(3,0) A survey of the period from the eclipse of Rome to the advent of the Renaissance, emphasizing human migrations, feudalism, rise of towns, and cultural life.

372 The Renaissance 3(3,0) An examination of the transitional period of European civilization (ca. 1300-1500), with emphasis on institutional, cultural, and intellectual developments.

373 Age of the Protestant Reformation 3(3,0) The evolution of Modern Europe (ca. 1500-1660), as affected by the Reformation, wars of religion and growth of nation-states. The study will include intellectual advances and the beginnings of European expansion overseas.

374 Europe in the Age of Reason 3(3,0) A study of the quest for order and the consolidation of the European state system between 1660 and 1789 with emphasis on the idea of absolutism, the question of French hegemony, and the synthesis of the eighteenth century Enlightenment.

375 Revolutionary Europe 3(3,0) A history of Europe from the outbreak of the French Revolution through the Revolutions of 1848, with emphasis on the conflict between the forces of change and those of conservatism within the states and in Europe in general.

377 Europe in Crisis, 1914 to the Present 3(3,0) A study of the political, economic, and social institutions of the European peoples from 1914 to the present. Attention will be given to the world wars and to the collapse of the European state-system.

382 History of Modern Germany 3(3,0) German history from Bismarck and unification in 1870 through the period of Hitler and the Nazis to Germany's role in present-day Europe.

384 History of Modern France 3(3,0) French history from the mid-19th century to the present with particular emphasis on France since 1900.

386 History of Modern Russia 3(3,0) Russian history in the 20th century. Emphasis is on the Russian revolution of 1917 and on Russian development under Lenin, Stalin, and the leadership of the Communist Party.

With departmental permission any 400-level course in history may be repeated one time for credit.

400, 600 Studies in United States History 3(3,0) Topics and problems in the history of the United States from the Colonial era to the present.

440, 640 Studies in Latin American History 3(3,0) A consideration of selected and varied topics in Latin American history through readings, class discussions, and individual or group projects. Special attention will be given to the use of an inquiry or problem-solving method of historical analysis and to the cultivation of a comparative perspective.

450, 650 Studies in Ancient History 3(3,0) Selected topics in the field of ancient history ranging from pre-Biblical times to the fall of the Roman Empire.

460, 660 Studies in British History 3(3,0) An examination of selected themes, topics, or periods in British history from Anglo-Saxon times to the present.

470, 670 Studies in Early European History 3(3,0) Study of selected topics or themes in European history from the fall of the Roman Empire to the age of industrialization.

471, 671 Studies in Modern European History 3(3,0) Study of selected topics or problems in European history from the end of the Old Regime to the present.

492, 692 Studies in Diplomatic History 3(3,0) Selected topics and problems in international conflict and conflict resolution among nations. Concentration will usually be in twentieth century history.

493, 693 Studies in Social History 3(3,0) Studies in the ways people have earned their livings and lived their lives, individually and as communities, in the confines of different societies.

494, 694 Studies in Comparative History 3(3,0) Selected topics in comparative history, contrasting and comparing similar historic developments in different nations, geographic areas, or civilizations.

495, 695 Studies in the History of Ideas 3(3,0) Selected topics and themes in the development of ideas that have had an impact on the behavior of individuals and civilizations.

496, 696 Studies in Legal History 3(3,0) Study of selected problems in the development of law and the system of criminal and civil justice.

499 Independent Study 3(3,0) Study of selected problems in history under the direction of a faculty member chosen by the student. The student and faculty member develop a course of study designed for the individual student and approved by the head of the department prior to registration.

700 United States Through the Civil War 3(3,0)

710 United States Since 1865 3(3,0)

720 Southern History 3(3,0)

760 British History 3(3,0)

770 Europe to the Eighteenth Century 3(3,0)

775 Europe Since the Eighteenth Century 3(3,0)

790 Historical Area Studies 3(3,0)

800 Seminar in United States History 3(3,0)

860 Seminar in British History 3(3,0)

870 Seminar in European History 3(3,0)

880 Special Topics in History 3(3,0)

885 Independent Study 3(3,0)

891 Master's Research. Credit to be arranged.

HORTICULTURE (HORT)

Professors: R. L. Andersen, *Head;* J. P. Fulmer, R. G. Halfacre, J. R. Haun, A. R. Mazur, W. L. Ogle, E. T. Sims, Jr.; *Associate Professors:* D. C. Coston, A. J. Pertuit, Jr., D. F. Wagner; *Assistant Professors:* D. W. Bradshaw, D. W. Cain, J. D. Caldwell, M. T. Haque, A. R. Kingman

201 General Horticulture 3(2,2)F, S A working knowledge of the fundamental plant processes is developed, showing the influence of light, temperature, water and nutrients upon vegetative growth and reproduction of horticultural plants. Production practices, harvesting, storage and marketing of the principal fruit, vegetable and ornamental crops are discussed with demonstrations and practice in greenhouse and orchard. *Preq:* BIOL 103, 105, or CH 101.

301 Horticulture and Man 2(2,0) Study of various areas of horticulture as they affect the daily affairs of man. Topics include the horticultural industry, factors influencing plant growth, establishment and maintenance of home grounds, house plants, care of perishable horticultural products, and flower arranging.

302 Principles of Vegetable Production 3(2,3)F The general principles of vegetable growing and handling. Phases receiving special emphasis are economic importance, producing areas, management practices, plant forcing, cultural practices, irrigation, quality factors, harvesting, grading, packing, storage, market inspection, transportation, refrigeration, exhibition and seed production. *Preq:* HORT 201.

303 Plant Materials 3(2,3)F Woody, ornamental plants and their aesthetic and functional uses in landscape developments. The study covers habit of growth, ultimate size, texture effect, period of bloom, color, and cultural requirements.

304 Designing with Herbaceous Plant Materials 3(2,3) Covers the study of habit of growth, size, period of bloom, color, and cultural requirements of herbaceous plant materials as well as introductory design incorporating the use of both herbaceous and woody-plant materials. *Preq:* HORT 303 or consent of instructor.

305 Plant Propagation 3(2,3)F All phases of plant propagation from seeds, bulbs, divisions, layers cutting, budding, and other types of grafting are comprehensively treated. Timing, manner and material for making cuttings; temperature and media requirements and propagation structures for rooting cuttings of ornamental and fruit trees, shrubs, and indoor plants will be studied. *Preq:* HORT 201 or consent of instructor.

308 Landscape Design 3(2,3)S Landscape planning of residential and public properties in order to achieve best use and most enjoyment from a given piece of ground. *Preq:* HORT 303.

310 Floriculture 3(3,0) Greenhouse production of commercial flower crops. Studies include fertilizers and insect and disease problems of bench and pot plants. *Preq:* HORT 201.

352, 652 Commercial Pomology 3(2,3)F Fruit bud formation, rest period and water relations of fruit plants, soils, fruit setting; orchard soil management and responses of various fruits to fertilizers; principles of pruning, effect of climatic differences, freezing of tissues and means of avoiding injury; harvesting, transportation and storage. *Preq:* HORT 201.

406, 606 Nursery Technology 3(2,3)S Principles and techniques in handling nursery crops. *Preq:* HORT 303, 305.

407, 607 Landscape Design 3(2,3)F The first half of this course is a study of trees, shrubs, vines and ground covers used in landscape planting. Attention is given to cultural requirements, growth

habits, period of bloom, texture, and fall color. The second half of the course is devoted to landscape planning for small residential properties.

409 Seminar 1(1,0)F Recent research work on various phases of horticulture, methods of conducting investigations, and preparation of report of investigations.

410 Seminar 1(1,0)S Continuation of HORT 409.

412, 612 Turfgrass Management 3(2,3)F Studies of warm and cool season turfgrasses in relation to value, use, regional adaptation, establishment, soils, and cultural practices. The influence of environmental, cultural, and genetic factors on turf quality and serviceability. Identification of grass and weed species and discussion of programs for the management of lawns, parks, roadsides, and golf courses. *Preq:* BIOL 103, 105 or equivalent.

413, 613 Advanced Turfgrass Culture 3(3,0) Studies on the anatomy and morphology of turfgrasses, soil physical properties, soil amending, and turfgrass nutrition. Discussion of integrated turfgrass pest management programs, soil microbiological activities and the turfgrass ecosystem. *Preq:* HORT 412 or equivalent.

415, 615 Foliage Plants for Interior Utilization 3(2,3)F The application of foliage plant requirements for their selection and maintenance in interior environments. Laboratories include plant identification, experiment, and graphic representation. *Preq:* BOT 205, HORT 201 and consent of instructor.

416 Floral Design 2(1,3) Topics covered include simple arrangements (history, containers, mechanical aids, etc.), arrangements for specific occasions, church arrangements, funeral designs, bride's bouquets, dried arrangements and flower preservation, corsage work, foliage arrangements, bonsai, terrarium, Christmas wreaths, and foliage plant identification. *Preq:* BIOL 103, 105 or equivalent.

454, 654 Subtropical and Tropical Horticulture 3(3,0) A survey of the horitcultural characteristics, culture, harvesting, and handling of subtropical and tropical fruits, vegetables, and ornamental crops of economic significance. The history, importance, adaptation, and world use of these crops will be studied. *Preq:* AGRIC 104 or BIOL 103, 105, and HORT 201 or 301 or consent of instructor.

455, 655 Small Fruit and Nut Crops 4(3,3)F An indepth survey of taxonomical, morphological, and physiological characteristics of small fruit and nut crops as they relate to the study of horticultural characteristics, culture, production, harvesting, and handling of both commercial and home-grown grapes, blueberries, strawberries, brambles, pecans, and walnuts. *Preq:* HORT 305 or consent of instructor.

456, 656 Vegetable Crops 3(3,0) The principles and practices employed in the commercial growing and marketing of vegetable crops. Emphasis is placed on temperature requirements, plant characteristics, varieties, soils, fertilizers, weed control, harvesting and preparation for market.

461, 661 Problems in Landscape Design 3(2,3)F Landscape planning for larger residential properties, schools, industrial plants, real estate developments; detailed finished plans; further study of materials used; original problems; field study. *Preq:* HORT 308 or 407.

462, 662 Landscape Design Implementation 3(2,3)S Implementation of landscape plans, including interpretation of specifications, bidding, planting methods, construction materials and installation methods, irrigation, lighting, and allied landscape specialties. In addition maintenance contracts, equipment, methods, materials, and labor management are studied. *Preq:* HORT 308.

464, 664 Postharvest Horticulture 3(2,2)F The handling of fruits, vegetables, and ornamental crops after harvesting. Subjects include spoilage problems, hydrocooling, common and cold storage of crops, packaging and processing procedures.

470, 670 Hortitherapy 2(2,0) The use of horticultural appeal and methods for improvement of physical and mental well-being will be emphasized. A number of activities will be planned for use in horticultural therapy programs for exceptional individuals in any type of therapeutic situation. *Preq:* BIOL 103, 105 and consent of instructor.

671, 671 Internship 1-6(0,2-12) Internship under competent supervision in an approved agency dealing with horticultural endeavors. Internships will be designed to provide students with on-the-job horticultural experience. The student will submit monthly reports during the internship and will conduct a departmental seminar at its conclusion. *Preq:* Junior standing and consent of instructor.

673, 673 Hortitherapy Laboratory 1(0,2) Activities which will be presented will enable students, in turn, to present techniques to exceptional individuals. Emphasis will be placed on performing horticultural skills which are suitable for any therapeutic situations. *Preq:* For non-Horticultural majors registered in HORT 470.

801 Problems in Small Fruit Production 3(3,0)

802 Research Systems in Horticulture 3(2,3)

803 Experimental Olericulture 3(3,0)

804 Scientific Advances in Ornamental Horticulture 3(3,0)

805 Physiochemical Procedures for Determining Quality in Horticultural Crops 3(2,3)

806 Postharvest Physiology and Handling of Horticultural Crops 3(3,0)

807 Pomology 3(3,0)

808 Special Investigations in Horticulture 2(2,0)

809 Seminar I 1(1,0)

810 Seminar II 1(1,0)

811 Quantitative Exposition of Plant Development 2(1,3)

870 Practicum in Hortitherapy 3(1,4)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

HOSPITAL AND HEALTH SERVICES ADMINISTRATION (HADM)

Professor: B. J. Todd; *Associate Professor:* J. M. McDonald; *Lecturer:* D. K. Oglesby, Jr.

308 Hospital and Health Services Administration 3(3,0) An introduction to the organization and operation of modern American hospitals, separate clinics and public health services. Included will be legal status, organizational peculiarities, and specific legislation affecting such agencies. *Preq:* Junior standing.

610, 610 Hospital Internship 3(0,9) The student will spend nine hours per week on a specified program of observing, practicing and experiencing the duties of hospital administrators in selected local hospitals. The course will be specifically outlined along with the amount of time the student will spend in each phase or department of the hospital. Student progress will be constantly monitored by University faculty and hospital staff. *Preq:* HADM 308.

800 The Function and Organization of Hospitals and Health Services Administration 3(3,0)

HUMANITIES (HUM)

Professor: J. J. McLaughlin; *Associate Professors:* S. K. Eisiminger, E. A. Freeman, V. A. Rudowski

301 Humanities 3(3,0) A general introduction to humanistic studies, stressing the interrelatedness of various humanistic disciplines. Such fields as art, architecture, music, literature, philosophy, and drama will be considered as they interact with, support, and develop each other in various cultural settings. *Preq:* Sophomore standing or consent of instructor.

302 Humanities 3(3,0) Continuation of HUM 301. *Preq:* Sophomore standing or consent of instructor.

305 Ideas of Progress in Science and the Arts 3(3,0) An investigation of the ideas of progress as they are found in literature, science, the arts, music, and philosophy. *Preq:* Sophomore standing.

306 Creative Genius in Western Culture 3(3,0) An investigation of creativity through study of great innovators in art, literature, music, and ideas. May be repeated once for credit. *Preq:* Junior standing or consent of instructor.

309 Studies in Humanities 3(3,0) An interdisciplinary approach to the humanities. Specific subject matter varies according to the instructor and as approved by the Dean of Liberal Arts. May be repeated for credit one time. *Preq:* Junior standing or consent of instructor.

INDUSTRIAL EDUCATION (INED)

Professors: P. C. Caley, J. P. Crouch, D. E. Maurer, H. E. Morgan, Jr., A. F. Newton, *Head;* D. H. Pate, Jr., W. E. West; *Associate Professors:* B. V. Burkett, Jr., G. G. Lovedahl; *Assistant Professors:* C. H. Isbell, C. D. Schmittou, B. L. Smith

101 Introduction to Industrial Education 1(1,0) An introduction to the field of industrial education in terms of the underlying philosophies, the aims and goals, and the specific objectives of each of the Industrial Education options. Course activities include research and field experiences in industrial education.

102 Woodworking I 2(1,3) A study of wood, its properties and the requisite skills necessary for understanding the use of wood in our technological way of life.

103 Woodworking II 2(1,3) Continuation of INED 102 in the study of wood, its properties, skills in machine and tool use with wood, project design, project costs and finishing processes necessary for teachers of industrial subjects. *Preq:* INED 102, 106.

105 Machining Practices 3(1,6) Basic practical shop experiences on the lathe, drill press, milling machine and shaper. Benchwork, measuring tools, theory and demonstrations related to a survey of fundamental machining practices. *Preq:* INED 101.

106 Drafting for Industrial Education I 3(1,6) A basic drafting course which deals with sketching, orthographic projection, isometrics, sections, auxiliary views, dimensioning, developments, and intersections.

107 Drafting for Industrial Education II 3(1,6) Continuation of INED 106, dealing with drafting in specific fields such as welding, electronics, topography, and computer-aided drafting. Working and detail drawings of machine parts including threaded fasteners, cams and gears, and techniques of inking are studied. A portion of the course is devoted to organizing materials for teaching drafting. *Preq:* INED 101 and 106 or equivalent.

108 Training Programs in Industry I 3(3,0) Introduction and first-hand experience in industrial training programs. Emphasis placed on observing and participating in actual training situations as well as communications and media usage in industry. *Preq:* INED 101.

203 Basic Metal Processes 3(1,6) Material separating, forming and combining practices in the metals industries through the study of basic casting, welding and sheet metal techniques.

205 Power Technology 3(2,2) A study of power in terms of energy sources, and the generation, transmission and utilization of power. Emphasis is placed on the development of insights and understandings of the scientific and operational principles involved in the production, transmission and utilization of power. *Preq:* INED 101.

206 Advanced Drafting and Design 3(1,6) Study of the relationship of designing and engineering, the design process, stylistic periods, design, research, and product development. Various methods of technical illustration are utilized in the course. *Preq:* INED 106 or equivalent.

208 Electricity 3(2,3) Theory and application of dc and ac fundamentals, including instrumentation, power sources, circuit analysis, motors, construction wiring, and electronic principles and components. *Preq:* INED 101.

220 Recreational and Avocational Crafts 3(2,3) Provides exploratory experiences in the performance of a variety of arts and crafts activities, and encourages the development of an understanding of the purpose of arts and crafts in the comprehensive recreational program.

302 Dwelling Materials and Construction Methods 2(1,2) This course is designed as an introduction to the commonly used building materials and the methods of combining them in present day construction. *Preq:* INED 102.

10 Methods of Trade Teaching 3(3,0) This course is designed to give basic instruction to beginning teachers in tradework. Psychological factors of learning, individual differences, methods of teaching subjects, the special methods used in teaching skills, grading of students and keeping of proper records and reports. Offered in Summer Sessions only.

13 Arts and Crafts 3(1,6) A study of the art and craft of designing and making well-designed, useful objects. Emphasis on the development of skill and knowledge in the industrial crafts. Included will be laboratory activity involving work with wood, metal, ceramic, textiles, paper, and leather materials. *Preq:* INED 101.

16 Plastics and Plastic Processes 3(3,0) The industrial, commercial and personal uses of plastics are discussed and demonstrated. In addition, the kinds of plastics, their properties, and special uses are studied. Offered in Summer Sessions only.

17 Management of Industrial Education Laboratories 3(2,2) Management and operation of unit and multiple-activity laboratories, including laboratory design, selection and procurement of tools and equipment, budgeting management, and coordination of activities in laboratory courses.

20 Machine Woodworking 2(1,3) Basic characteristics of woodcutting, shaping, and finishing operations by use of machinery and auxiliary tools. Includes project work. *Preq:* Junior standing.

25 Industrial Organizations and People 3(3,0) A study of the relationship of training and safety personnel to the kinds of tasks they are asked to perform in industrial situations. Emphasis is on safety knowledge development and on techniques which may be used in industrial safety training. *Preq:* INED 101 or consent of instructor.

50 Industrial Cooperative Experience 6(0,18) A full-time work experience program in industry. The course is offered during the summer only. Students are requested to register with the instructor one semester prior to the summer in which they plan to enroll. *Preq:* Junior standing in the Vocational-Technical Education program; consent of instructor.

72 Arts and Crafts for the Elementary Child 3(2,3) Provides the elementary school teacher with an opportunity to develop skills and knowledge in the use of a variety of media suitable for integrating the study of industry and industrial technology into the usual classroom procedures.

02 Directed Teaching 12(0,36) Supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for securing experience in teaching industrial subjects. *Preq:* INED 317, 425, and grade-point ratio required for graduation.

04, 604 Organization of Industrial Training Materials 3(3,0) Study of the identification, selection, and organization of subject matter appropriate for industrial training programs. Emphasis is placed on analysis techniques, session and demonstration planning, written instructional materials development, trainee evaluation, and planning instructional schedules. *Preq:* Education for Industry option, Senior standing, INED 108, and completion of a minimum of three courses selected from EC 104, INED 102, 105, 106, 203, 205, or 208.

05, 605 Course Organization and Evaluation 3(3,0) Problems, techniques and procedures in the preparation, selection and organization of subject matter for instructional purposes. Methods, techniques and preparation of materials used in the evaluation of student achievement in industrial education subjects.

07, 607 Architectural Drafting for Industrial Education 3(1,6) Study of the major aspects of architectural drawing, such as plot, floor, and foundation plans; wall sections; and elevations. *Preq:* INED 106.

08, 608 Training Programs in Industry II 3(3,0) Basic concepts of supervision, administration, and management of training programs. Emphasis on determining training requirements, planning, directing, and evaluating training programs. *Preq:* INED 108, 405.

10, 610 Special Institute Course: Topics in Industrial Education 1-3(1-3,0) Subject areas organized according to institute needs. Content of the course will be planned cooperatively by the University and the school system or agency requesting the course. *Preq:* Teacher or Graduate standing.

414, 614 Electronics for Teachers 3(1,6) Principles of electronics as applied in communications and automatic controls involving transistors, integrated circuits, and other electronic devices and materials for the preparation of teachers of industrial arts and vocational-technical electricity and electronics. *Preq:* INED 208 or equivalent.

415, 615 Construction Practices 3(2,3) A study of industrial practices affecting man, materials, and equipment employed by the construction industry. Activities are directed to developing a working knowledge of construction technology and a framework for incorporating this industry into the industrial arts curriculum of the secondary school. *Preq:* INED 101 or Graduate standing.

418, 618 Technological Concepts in Manufacturing 3(2,3) This course is designed to familiarize industrial arts students with the technological concepts of management, production, and personnel practices employed in manufacturing industries. Students also will develop materials and utilize methods which will assist them in teaching concepts about manufacturing at the secondary-school level. *Preq:* INED 101 or Graduate standing.

421 Vocational Cooperative Programs 3(3,0) A study of the developments, objectives and principles of cooperative training programs. Emphasis is on the organization, promotion, and management of programs in vocational education. *Preq:* Consent of instructor.

422, 622 History and Philosophy of Industrial and Vocational Education 3(3,0) A study of industrial and vocational education programs with the intent of developing a sound individual philosophy of industrial and vocational education. General topics covered: history; local, state, and federal legislation; types of vocational-technical programs; professional organizations; manpower utilization, vocational guidance, and training; industry, labor, and school relationships.

424, 624 School Safety 3(3,0) Study of the principles of school safety emphasizing safety analyses, accident prevention, remediation of unsafe conditions, development and use of instructional materials, and school liability. *Preq:* Senior or Graduate standing in Education.

425, 625 Teaching Industrial Subjects 3(3,0) Effective methods and techniques of teaching industrial subjects. Emphasis is given to class organization, preparation of lesson outlines, and audio-visual aids. *Preq:* ED 335.

432, 632 Advanced Woodworking 2(1,3) An advanced consideration of machine methods and developments, materials, quality factors, and evaluation of instructional materials. *Preq:* INED 102.

435, 635 Advanced Industrial Metalworking Practices 3(2,3) Continuation of INED 203, enabling advanced studies in welding, foundry, and structural metals. A portion of the course will be devoted to studying existing metals manufacturing industries and to developing and using curriculum materials for teaching metalworking concepts. Field trips will be taken. *Preq:* INED 203.

438, 638 Advanced Machining 3(1,6) Advanced experiences in the set-up, operation and maintenance of machine tools and equipment. Project and product design. Study and reports of recent machining technological developments. *Preq:* INED 105.

441 Comprehensive Laboratory in Industrial Education 3(1,4) Course designed to develop skill in working in and the management of multiple activity program as carried out in the industrial arts and prevocational laboratories. Opportunity is provided to develop a management plan for multiple activities in comprehensive laboratories that the student can use during the directed teaching experience. *Preq:* INED 101 and a minimum of 4 courses selected from the following: GC 104, INED 102, 105, 203, 205, 208.

442 Competency Testing in Vocational Subjects 3(3,0) This course is especially designed for trade teachers who have assisted in making trade tests for S.C. Certification program. Teachers who expect to assist in making trade tests are also urged to enroll in this course. The course is devoted to revising present trade tests and developing tests in new fields. Offered in Summer Sessions only.

450 Industrial Cooperative Experience 6(0,18) Continuation of INED 350. Summer only. *Preq:* Senior Standing, INED 350, and consent of instructor.

1 Special Projects 3(3,0) The student is assigned a project in accordance with his needs and pabilities. Projects are either experimental, theoretical or developmental and cover subjects not proughly covered in other courses. *Preq:* Consent of Instructor.

2, 652 Advanced Projects 1-6 The student gains depth in content by completing a project under e supervision of an instructor in one of the following subject areas: Arts and Crafts, Drawing and esign, Electricity and Electronics, Graphic Arts, Metalworking, Occupational Education, Power, d Woodworking. *Preq:* Consent of instructor.

0, 660 Career Education 3(3,0) An introduction to the concepts and philosophical basis for career ucation with emphasis on the applications of career education as an integrating force within the tal school curriculum. This course is designed for all students preparing to teach or those seeking improve their teaching competencies. *Preq:* AGED 201, ED 100, INED 101, or Graduate standing.

4, 664 Still Picture Production 3(1,4) This course includes media selection, specification of learn- g outcomes, program planning, storyboarding, art creation and direction, photography, scripting, d audio tape production and synchronization. *Preq:* GC 104 or consent of instructor.

5, 665 Motion Picture Production 3(1,4) A study of how to produce video tape and motion pic- re presentations. *Preq:* INED 464 or consent of instructor.

8, 668 Advanced Power Technology—Fluid 3(2,2) Continuation of INED 205 with emphasis on nsmission and control of power by means of hydraulics and pneumatics. Provides teachers with assroom opportunities to learn fundamental theory and applications of fluid power and gives draulic and pneumatic mechanisms used extensively in the manfacturing, construction, and nsportation areas of industrial education. *Preq:* INED 205.

0, 670 Internal Combustion Engines 3(2,3) Involves study of the internal combustion engine: eory of operation, applications, methods of analyzing performance, and troubleshooting alfunctions. The course is intended as an elective for Industrial Arts and Vocational-Technical tion majors who desire proficiency in this essential area of Industrial Education. *Preq:* INED 205 consent of instructor.

6, 696 Public Relations 3(3,0) This course emphasizes the techniques and methods of effective blic and industrial relations which contribute to understanding and cooperation of labor, siness, professional, educational, and industrial groups.

5 Seminar in Industrial Education 1(1,0)

0 Recent Process Developments 3(3,0)

0 School Shop Design 3(3,0)

5 Curriculum Planning and Development in Industrial Education 3(3,0)

0 Curriculum Materials Development in Industrial Education 3(3,0)

1 Administration and Supervision of Vocational Education 3(3,0)

5 American Industries 3(3,0)

9 (AGED) Research in Education 3(3,0)

4 Project 1-6(1-6,0)

5 Special Problems I 3(3,0)

6 Special Problems II 3(3,0)

NDUSTRIAL ENGINEERING (IE)

rofessors: J. A. Chisman, *Acting Head;* C. R. Lindenmeyer; E. L. Thomas, Jr.; *Associate rofessors:* E. R. Baker IV, R. M. Harnett

5 Methods of Industrial Engineering I 3(2,3) Methods engineering and work measurement for st control and reduction, planning, and scheduling. Graphic system representation techniques, me study, work sampling, standard data development, and predetermined basic motion time ta systems are introduced. *Coreq:* MTHSC 301 or consent of instructor.

266 Methods of Industrial Engineering II 3(2,3) Predetermined basic motion time data analysis work methods for synthesis of effective work methods and standards development. Methods-Tim Measurement (MTM) is presented in detail to permit application proficiency. Standard data deve opment, using a variety of techniques is covered with emphasis on the use of stepwise multip regression analysis. A field project is required. *Preq:* IE 265 or consent of instructor.

306 Manufacturing Processes 3(2,3) The basic structure of manufacturing processes, properties engineering materials and their uses, and methods for restructuring various materials are discusse and demonstrated. *Preq:* Consent of instructor.

361 Industrial Applications of Statistics 3(3,0) A comprehensive survey of techniques from applie statistics and probability which are most applicable to modeling and problem solving in industr Topics included are probability and statistical theory review, statistical quality control chart acceptance sampling, curve fitting, forecasting, and reliability analysis. *Preq:* MTHSC 301 or co sent of instructor.

365 Methods of Industrial Engineering III 3(2,3) A study of the principles and techniques of plan layout. Quantitative techniques for facilities location and arrangement. Economic selection materials handling equipment and integration of this equipment into the layout plan to provid effective product flow. A field project is required. *Preq:* IE 266 or consent of instructor.

452, 652 Reliability Engineering 3(3,0) A probabilistic approach to assessing system reliabilit Methods for analyzing serial, parallel, and complex systems include decomposition and cut-se analysis. Reliability life testing and its acceleration are covered. Essential elements of maintain ability are identified and related to system availability. *Preq:* Multivariate Calculus and Intro ductory Statistics or consent of instructor.

480, 680 Methods of Operations Research I 3(3,0) Topics include linear programming, sensitivit analysis, the transportation model, networks, goal programming, integer programming, an dynamic programming. *Preq:* MTHSC 106 and 301 or consent of instructor.

481, 681 Methods of Operations Research II 3(3,0) Topics include decision theory, game theor PERT-CPM, inventory models, Markovian decision processes, queueing theory, classical nonlinea optimization, and nonlinear programming. *Preq:* IE 480 or consent of instructor.

482 Systems Modeling 3(3,0) Modeling of discrete and continuous industrial systems using a digita computer. The purpose, theory, and techniques of systems modeling are presented. *Preq:* MTHS 301 or consent of instructor.

483 Case Studies in Industrial Engineering 3(3,0) Actual industrial case studies will be used t strengthen the student's ability to identify problems, to select a solution procedure, and to recom mend an action. *Preq:* Senior standing in Industrial Engineering.

484, 684 Engineering Economic Analysis 3(3,0) Basic principles and techniques of economic analysi of engineering projects. Consideration of time value of money, short- and long-term investments replacement analysis, depreciation methods, cost allocation and measures of cost effectiveness *Preq:* Senior standing in Engineering or consent of instructor.

486, 686 Production Planning and Control 3(3,0) Fundamentals underlying the determination o production capacity requirements, economic lot sizes, and the regulation of flow and storage o materials to, within, and from the production system. Elements of forecasting, determination o materials requirements, scheduling, inventory control, etc. Consideration of data processing methods. *Preq:* IE 481 or consent of instructor.

488, 688 Human Factors Engineering 3(2,3) Human factors engineering as a systems desig method. Industrial application of human factors data to recognize and/or measure behaviora and physical limitations, investigate deficiencies, and improve these systems based on safety health, and worker satisfaction. A field study or research experiment proposal is required. *Preq* MTHSC 301 or consent of instructor.

495 Senior Research I 1(0,3) Course entails attendance at weekly seminar and a student project applying the principles of industrial engineering. *Preq:* Senior standing.

96 Senior Research II 1(0,3) Course entails attendance at weekly seminar and an advanced student project applying the principles of industrial engineering. *Preq:* Senior standing.

ITALIAN (ITAL)

ssociate Professors: L. T. Perry, J. B. Romeiser

01, H101 Elementary Italian 4(3,1) An introductory course stressing grammar, pronunciation, oral ractice, and reading skills. Attention is given to practical everyday living as well as cultural onsiderations.

02, H102 Elementary Italian 4(3,1) Continuation of ITAL 101. *Preq:* ITAL 101 or consent of instructor.

96 Practicum in Italian 1(0,1) An on-campus program of teaching foreign languages to children. tudents work under the supervision of faculty in planning and teaching one 45-minute class per eek to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year language anding or consent of department head.

01, H201 Intermediate Italian 3(3,0) A brief review of ITAL 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of Italian prose in short stories nd plays. *Preq:* ITAL 102.

02, H202 Intermediate Italian 3(3,0) Increasingly difficult readings in Italian literature, supplemented with classroom discussions and compositions. *Preq:* ITAL 201.

98 Directed Reading 1-3(1-3,0) Directed study of selected topics in Italian literature, languages, nd culture. May be repeated for a maximum of 6 credits. *Preq:* Consent of department head.

ATIN (LAT)

rofessor: R. R. McGregor, Jr.; *Assistant Professor:* M. Cranston

01 Elementary Latin 3(3,0) A course for beginners designed principally to teach the reading of the anguage.

02 Elementary Latin 3(3,0) Continuation of LAT 101.

01 Intermediate Latin 3(3,0) A review of the fundamental principles of grammar in conjunction ith readings from the Classical period. *Preq:* LAT 102 or equivalent.

02 Intermediate Latin 3(3,0) Continuation of LAT 201 with the introduction of writings from the ate Latin and Medieval periods. *Preq:* LAT 201 or equivalent.

98 Directed Reading 1-3(1-3,0) Directed study of selected works in Latin. May be repeated for a otal of six semester credits. *Preq:* LAT 202 or equivalent and consent of department head.

AW (LAW)

ssociate Professor: S. H. Brown; *Assistant Professors:* C. T. Deal, E. C. Hipp, Jr.; *Lecturers:* . E. Deal, T. M. Patrick, Jr.

12 Commercial Law 3(3,0) An introduction to business law with primary attention given to contracts, agency, and negotiable instruments. *Preq:* Junior standing.

13 Commercial Law 3(3,0) Continuation of LAW 312 with emphasis on business organization, personal and real property, estates and bankruptcy, sales and secured transactions. *Preq:* LAW 312 or onsent of instructor.

22 Legal Environment of Business 3(3,0) The development of both state and national regulation of usiness. Attention is given to the constitutional force and limitations of power, specific areas in hich governments have acted, and the regulations that have been imposed in these areas. *Preq:* unior standing.

01 Labor Law 3(3,0) Basic labor law in the National Labor Relations Act, the Taft-Hartley and andrum-Griffin Acts. Legal problems raised by state and federal statutes such as workmen's compensation, unemployment compensation, wage and hour legislation, and equal opportunity laws. req: LAW 322, Junior standing.

LEISURE SKILLS (LS)

Professors: G. E. Howard, J. L. Stevenson; *Associate Professor:* C. R. White, Jr.; *Assistan Professors:* J. R. Pope, Jr., M. H. Wynn; *Visiting Assistant Professor:* G. R. Boettner; *Lecturers:* C. P. Kriese, H. A. Thomas

110 Bowling 1(0,3) Basic instructional program on techniques of bowling.

130 Alpine Skiing 1(0,45) Basic downhill snow skiing instruction including equipment selection safety, and maintenance; parallel turns; edging; carved and linked turns; wedeling; and safety and etiquette. There is an additional fee for this course. Taught during Christmas recess. (Contact the Department of Recreation and Park Administration in October.)

140 Fencing 1(0,3) Individual and group instruction for beginners in the basic skills and techniques of foil fencing.

150 Beginning Swimming 1(0,3) Fundamentals of swimming and water safety.

151 Aquatic Sports and Diving 1(0,3) This course is designed to acquaint the student with various forms of aquatic sports; competitive swimming, diving and water polo.

152 Sailing 1(0,3) Basic instruction in the nomenclature, safety and rescue techniques, and skills required to skipper sailing craft. *Preq:* Basic swimming skills.

153 Beginning Canoeing 1(0,3) Basic instruction in the nomenclature, strokes, and safety techniques in canoeing. *Preq:* Basic swimming skills.

160 Beginning Tennis 1(0,3) A fundamentals course stressing rules, basic strokes and strategy, with ample opportunity for practice.

162 Handball 1(0,3) A thorough knowledge and understanding of the rules, strategy, fundamental skills, and techniques of handball for the beginning player.

163 Racquetball 1(0,3) The basic skills, knowledge of rules, and strategy, and basic strokes.

170 Beginning Golf 1(0,3) A fundamental course stressing rules, strategy, and basic strokes.

190 Modern Dance 1(0,3) An introduction to modern dance techniques with emphasis on developing the style of movement and understanding the dance art form.

230 Advanced Alpine Skiing 1(0,45) Advanced downhill snow skiing instruction in such techniques as mogul skiing, check turns, free-style, and racing. There is an additional fee for this course. Taught during Christmas recess. (Contact the Department of Recreation and Park Administration in October.) *Preq:* LS 130 or consent of instructor.

254 Advanced Lifesaving 1(0,3) Course designed to enhance aquatic skills and to develop lifesaving techniques. It teaches progressive techniques and practice of lifesaving and water safety skills. *Preq:* Pass preliminary swim test.

255 Water Safety Instruction 1(0,3) Course teaches progressive techniques and practice of teaching swimming and lifesaving. *Preq:* LS 254.

260 Intermediate-Advanced Tennis 1(0,3) The opportunity to advance and correct mistakes in basic tennis skills. *Preq:* Basic tennis skills.

263 Intermediate Racquetball 1(0,3) A course stressing advanced skills, techniques, and strategy with ample opportunity for practice and competition. Conditioning drills and safety aspects will also be covered. *Preq:* LS 163 or consent of instructor.

MANAGEMENT (MGT)

Professors: C. V. Aucoin, E. E. Burch, Jr., E. A. LaRoche, H. H. Macaulay, Jr., G. E. Manners, Jr., C. W. McNichols III, W. W. Menke, M. J. Stahl, *Acting Head;* B. J. Todd, C. H. Whitehurst, Jr., N. K. Womer, T. W. Zimmerer; *Associate Professors:* A. F. Czajkowski, W. H. Hendrix, R. L. LaForge, J. M. McDonald, J. W. Patterson, C. B. Russell, D. M. Swanson; *Assistant Professors:* J. K. Butler, Jr., R. S. Cantrell, D. W. Grigsby, M. A. McKnew, T. B. Maertens, P. F. Petersen, W. P. Sineath III; *Instructors:* S. A. Schultz, C. S. Simpson, Jr.,

D. Wheeler; *Lecturers:* R. T. Christoph, J. M. Garris, D. K. Oglesby, Jr., C. C. Patterson, M. Rhyne, R. T. Sumichrast; *Visiting Instructors:* V. G. Clouse, C. F. Paterno, Jr.

0 Introduction to Business 3(3,0) The role of business in our society will be critically examined. ıe student will be exposed to a broad overview of the functions of a business. Enrollment for edit not allowed for students majoring in Accounting, Administrative Management, Financial anagement, or Industrial Management.

9 Computer Utilization I 1(0,3) Familiarization in the use of modern timesharing computer ter- nals and minicomputers. *Preq:* CPSC 120 or equivalent.

1 Principles of Management 3(3,0) Management's role as a factor of economic production. Func- ns of management, principles of organization, and behavior in organizations.

4 Statistical Quality Control 3(3,0) Basic statistical control techniques in all areas of industry. ocess capability, process control, and acceptance sampling are studied with special reference to actical applications. Emphasis is placed on the underlying statistical theory and the assumptions sociated with the various procedures. *Preq:* MTHSC 203 or 301.

7 Personnel Management 3(3,0) Principles, concepts, and techniques concerned with effective d efficient utilization of personnel. Emphasis on motivation, leadership, and human behavior as ey relate to employer-employee relations. Topics include personnel recruitment, classification, lection, training, development, and performance evaluation. *Preq:* Junior standing.

0 Management of Organizational Behavior 3(3,0) The purpose of this course is to provide the anagement student with a framework for understanding how behavior within business organiza- ns is managed. Particular emphasis will be placed on integrating management theory with cent developments in the behavioral sciences with distinct management applications. Theory, search, and business applications will be considered. *Preq:* MGT 301, 307, or consent of instructor.

2, 602 Production and Operations Management I 3(3,0) Managing, planning, and controlling pro- ıction and service operations with emphasis on demand forecasting, aggregate planning, produc- n scheduling, inventory management, and project planning. *Preq:* MASC 310 or 413 and MTHSC 3 or 301.

3 Special Problems 1-3(1-3,0) Planning, developing, and executing a research project related to e field of management or defense studies. *Preq:* Senior standing in Industrial Management or dministrative Management.

5, 605 Economics of Transportation 3(3,0) Topics covered include history and structure of ansportation systems in the United States, the nature of transportation costs and rates, transpor- tion systems as factors in industrial location, government policy toward transportation, and ansportation and national security. *Preq:* Senior standing and consent of instructor.

6, 606 Location Economics 3(3,0) A theoretical study of the general factors which determine dustrial location in a market place economy. Current literature is surveyed. A comparison of cation theory and actual location patterns is stressed. *Preq:* Senior standing or consent of structor.

7 Directed Research 1(1,0) Planning, developing, and executing a research project related to the eld of management. *Preq:* Senior standing in Administrative Management or Industrial Manage- ent.

8, 608 Production and Operations Management II 3(3,0) Managing, planning, and controlling oduction and service operations with emphasis on the different types of processes, job design d standards, deciding future operations, and planning operations strategy. *Preq:* MASC 310 or 3 and MTHSC 203 or 301.

9, 609 (ECON) Managerial Economics 3(3,0) See ECON 409.

5, 615 Business Policy 3(3,0) This is a capstone course for seniors. The case method is used in nalyzing complex business problems requiring the student to integrate his knowledge of the func- onal areas of business. Student participation and written and oral communication are stressed. eq: MGT 301 or 307 and Senior standing.

416, 616 Management of Human Resources 3(3,0) Recent developments in the management of human resources with emphasis on results of research into the motivation, development of potential, and full utilization of the human resources. *Preq:* MGT 307 or consent of instructor.

417, 617 Logistics Management 3(3,0) Management of physical distribution and supply systems with emphasis on design concepts, cost determinants and control. *Preq:* Senior standing.

418, 618 Management Information Systems 3(3,0) The use of data processing concepts as an aid in implementing managerial functions. Electronic data processing terminology, software, hardware, computer operations and techniques, systems analysis and the principles of management information systems design and implementation are emphasized. *Preq:* CPSC 120 or equivalent. *Coreq:* MGT 499.

420, 620 Defense Management 3(3,0) Examines components and budget classifications as well as organization and management systems employed in the Department of Defense. *Preq:* ECON 419 or consent of instructor.

422 Small Business Management 3(3,0) The study of the management of the small independently owned and operated business. Emphasis will be placed upon analyzing new business opportunities, planning and establishing a going concern, and managing the contemporary small business. Field experience in consulting with small businesses will enhance the student's understanding of the unique opportunities and problems of small business organizations. *Preq:* ACCT 201, MGT 301, MKT 301.

499 Computer Utilization II 1(1,0) Components of computer systems and effective methods of selection and utilization. Topics include review of terminology, methods of communicating with computer personnel, languages, package programs, package systems, and sources of current literature. *Preq:* CPSC 120 or equivalent. *Coreq:* MGT 418.

800 Management Gaming 1(0,3)

801 Quantitative Economic Analysis 3(3,0)

802 Finance 3(3,0)

803 Operations Management 3(3,0)

804 Managerial Policy 3(3,0)

805 Advanced Quality Control 3(3,0)

807 Comparative Management Theory 3(3,0)

810 Management and the Law 3(3,0)

811 Advanced Marketing Analysis 3(3,0)

812 Transportation Planning and Policy 3(3,0)

816 Management of Human Resources 3(3,0)

891 Master's Research. Credit to be arranged.

910 Seminar in Operations Management 1-3(1-3,0)

911 Seminar in Decision Theory 1-3(1-3,0)

912 Seminar in Financial Analysis 3(3,0)

913 Management Systems Analysis 3(3,0)

914 Seminar in Marketing Management 3(3,0)

991 Doctoral Research. Credit to be arranged.

MANAGEMENT SCIENCE (MASC)

Professors: C. V. Aucoin, E. E. Burch, Jr., C. W. McNichols III, G. E. Manners, Jr., W. W. Menke, M. J. Stahl, *Acting Head;* B. J. Todd, N. K. Womer; *Associate Professors:* A. F. Czajkowski, R. L. LaForge, J. W. Patterson; *Assistant Professors:* R. S. Cantrell, M. A. McKnew

10 Introduction to Management Science 3(3,0) Quantitative methods of the management scientist ith applications to economic, business, and industrial problems. Topics include regression nalysis, analysis of variance, sampling, and decision making under uncertainty, nonparametric ethods, elementary queuing models, and linear programming. *Preq:* ECON 211, MTHSC 301.

11, 611 (ECON) Introduction to Econometrics 3(3,0) See ECON 311.

13, 613 Management Science I 3(3,0) The role and use of management science techniques in deci- on making in business and industry. Stochastic and deterministic models will be emphasized. opics include linear programming, queuing, Markov chains, and simulation. *Preq:* Consent of structor.

14, 614 Statistical Analysis 3(3,0) Application of statistics in management decision making. mphasis is placed on the proper design, analysis and interpretation of planned experiments. opics include single factor through fractional factorial experiments. *Preq:* MTHSC 301 or quivalent.

16 Regional Science Methods 3(3,0)

17 (ECON) Econometric Methods I 3(3,0)

18 (ECON) Econometric Methods II 3(3,0)

12 Management Science II 3(3,0)

ARKETING

ssociate Professors: S. H. Brown, R. M. Reese, D. L. Sparks, G. L. Waddle, *Acting Head; ssistant Professors:* C. T. Deal, E. C. Hipp, Jr., M. C. LaForge, L. H. Stone; *Lecturers:* P. E. eal, T. M. Patrick, Jr.

01 Principles of Marketing 3(3,0) Principles and concepts involved in planning, pricing, promoting nd distributing of goods and services.

02, 602 Consumer Behavior 3(3,0) Examination of selected behavioral science concepts and their pplication to the understanding of consumer decision making. Text and cases. *Preq:* MKT 301.

23, 623 Marketing Communications 3(3,0) An analysis of mass and interpersonal communications marketing. Attention is given to communications theory, advertising, sales promotion, and per- onal selling. *Preq:* MKT 301.

24, 624 Sales Management 3(3,0) This course examines the major decisions involved in developing nd managing personal selling resources. *Preq:* MKT 301.

25, 625 Retail Management 3(3,0) Retailing is studied from a decision-making approach. Topics overed include target market analysis, location analysis, merchandising, human resources, pric- g, and promotion. *Preq:* MKT 301.

26, 626 Industrial Marketing 3(3,0) A study and analysis of the problems and approaches to the arketing of goods and services to commercial enterprises, governments, and nonprofit organiza- ons. Emphasis is placed upon developing strategic responses to market opportunities given com- etitive behavior. *Preq:* MKT 301.

27, 627 International Marketing 3(3,0) Study of marketing from the international point of view. mphasis will be placed upon the necessary modification of marketing thinking and practice for oreign markets due to individual environmental differences. *Preq:* MKT 301.

31, 631 Marketing Research 3(3,0) Planning, collection, processing, and utilization of information sed in marketing decision making. *Preq:* MKT 301, 402.

32, 632 Quantitative Marketing Analysis 3(3,0) Quantitative techniques applied to the investiga- on and solution of marketing problems. Emphasis is placed on the use of decision theory, game heory, Markov chain models, sales forecasting models, sample survey design, mathematical pro- ramming, simulation models, and marketing information systems. *Preq:* MKT 301, MTHSC 203 or 01.

450, 650 Marketing Management 3(3,0) Application of marketing principles in the investigation and solution of marketing problems. Managerial decision areas include products development, pricing, advertising personal selling, and channels of distribution. *Preq:* MKT 301, 402, 431 or consent of instructor.

495, 695 Seminar in Marketing 3(3,0) Indepth examination of timely topics in marketing. May be repeated for credit as topics vary. *Preq:* Consent of instructor.

MATERIALS ENGINEERING (MATE)

Professors: F. W. Cooke, C. C. Fain, G. C. Robinson, J. S. Wolf; *Associate Professor:* D. D. Moyle

304 Metallographic Analysis 3(1,6) Laboratory exercises will acquaint the student with typical industrial and research metallographic techniques involving specimen preparation and scientific photography. Standard and specialized laboratory equipment will be introduced and used with emphasis on relating metallographic observations to material properties.

405, 605 Physical Metallury 3(3,0) A comprehensive treatment of electron theory, latice defects, diffusion, solutions and phase equilibria, phase transformations, creep and fracture applied to metals and simple alloys, with emphasis on structure-property relationships. *Preq:* CRE 310.

420, 620 Introduction to Mechanical Metallurgy 3(3,0) Introduction to the elastic and plastic response of metals to pressure. Topics include the mechanisms and consequences involving ductility, brittleness, crystallography, fatigue, and creep. *Preq:* CRE 310 or equivalent.

422, 622 Introduction to Chemical Metallurgy 3(3,0) Application of structural and physical chemistry concepts to metallurgical systems. Emphasis is placed upon problem solving by both numerical and graphical methods. Major topics include bonding, intermetallic compounds, solid solutions, and heterogeneous equilibria. *Preq:* CRE 310 or equivalent; CH 331.

424, 624 Introduction to Extractive Metallurgy 3(3,0) Introduction to the economics, techniques, and theory of extracting metals from their ores. Emphasis is placed upon the chemistry and mechanics of extraction through problems involving efficiencies and yields of various metallurgical processes. *Preq:* CRE 310 or equivalent. *Coreq:* CH 331.

450, 650 Special Topics in Materials Engineering 1-4(0-4,12-0) A comprehensive study of a topic of current interest in the field of materials engineering. May be taken for credit more than one time. *Preq:* Consent of instructor.

461, 661 Elements of Metallurgy 3(2,3) A survey of industrial metallurgical processes including extraction of metals from their ores, primary fabrication of metals, heat and surface treatments, methods of secondary fabrication, and the mechanical testing of metals. Laboratory sessions emphasize the measurement of properties of metals and alloys as they are influenced by process variables. *Preq:* CRE 310 or equivalent.

462, 662 Heat Treatment of Steels 3(2,3) Industrial processing of commercially important ferrous material including plain carbon and low alloy steels; precipitation hardenable steels; tool steels and cast irons with special emphasis on response to heat treatment: annealing, hardening, alloying and atmosphere control. Laboratory determination of bulk and surface effects of treatment on mechanical properties. *Preq:* CRE 310 or equivalent.

463, 663 Metallurgy of Welding and Nondestructive Testing 3(2,3) Survey of welding processes, including resistance, forge, gas, arc, thermite, ultrasonic, electron beam and laser welding with reference to metallurgical effects and materials applicability. Includes nondestructive test methods for industrial weld inspection. Laboratory determination of microstructural and stress effects induced by welding and effects on material serviceability. *Preq:* CRE 310 or equivalent.

464, 664 Industrial Corrosion of Metals 3(2,3) Introduction to technical aspects of corrosion as it affects various industrial operations. Classification of types of metallic corrosion. Techniques of industrial corrosion protection with emphasis on materials selection and case histories. Industrial corrosion testing techniques and relation of metallic corrosion to basic electrochemical concepts. *Preq:* CRE 310 or equivalent.

55, 665 Introduction to Plastics 3(3,0) Basic polymer chemistry, structure, properties, and testing; manufacture and application of industrial plastics and elastomers. Crystalline-amorphous systems, fibers, addition and condensation polymers, block- and graft-copolymers, thermoplastics, thermosets, elastomers, catalysis, curing plasticizers, stabilizers, fire retarders, and pigments. *Preq:* CH 101, CRE 310 or equivalent.

600 Seminar in Materials Research 1(1,0)

620 Deformation Mechanisms in Solids 3(3,0)

622 Chemical Metallurgy 3(3,0)

624 Extractive Metallurgy 3(3,0)

691 Master's Research. Credit to be arranged.

MATHEMATICAL SCIENCES (MTHSC)

Professors: K. Alam, C. V. Aucoin, J. V. Brawley, Jr., E. E. Burch, Jr., F. M. Cholewinski, J. D. Fulton, *Head;* W. R. Hare, Jr., R. E. Haymond, P. T. Holmes, J. W. Kenelly, R. C. Laskar, D. R. LaTorre, R. F. Ling, J. K. Luedeman, S. M. Lukawecki, T. G. Proctor, W. H. Ruckle, D. R. Shier, B. J. Todd, K. T. Wallenius; *Associate Professors:* A. K. Bose, A. S. Cover, P. M. Dearing, Jr., R. E. Fennell, J. L. Flatt, J. C. Harden, Jr., R. E. Jamison, J. P. Jarvis, F. W. Morgan, M. C. Palmer, J. A. Reneke, L. A. Rife, R. D. Ringeisen, C. B. Russell, H. F. Senter, Y. Seo, J. R. Sullivan, D. D. Warner; *Assistant Professors:* C. R. Aucoin, R. Bose, J. R. Brannan, J. G. LaTorre, J. H. Nicholson; *Instructors:* I. B. Ibrahim, E. V. Sturgis, K. R. Watson, *Visiting Assistant Professor:* J. Vijay

100 Developmental Mathematics 2(5,0)SS Available on a voluntary basis for those who have not had algebra or need a complete review before taking MTHSC 104, 105 or 115. Carries no credit toward graduation. Not open for those that have passed any college-level mathematics course. Topics coverd are arithmetic (review), geometry (review), and basic algebra.

101 Finite Probability 3(3,0) Topics include probability, discrete random variables, and probability distribution. *Preq:* A satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

102 Introduction to Mathematical Analysis 3(3,0) An intuitive approach to the concepts and applications of calculus. Topics include functions and graphing, differentiation, and integration. Applications from social, biological, and management sciences are presented. Not open to those receiving credit for MTHSC 106. *Preq:* A satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

104 Trigonometry 2(2,0) Topics to be covered are circular functions, graphs of circular functions and their inverses, identities and conditional equations, trigonmetric functions and complex numbers.

105 Algebra and Trigonometry 5(5,0) Freshman mathematics. A unified course in algebra and trigonometry. Properties of real numbers, algebraic expressions, equations and inequalities in one variable, relations and functions, polynomial and rational functions, exponential and logarithmic functions, circular functions, trigonometric functions and conditional equations, matrices and determinants, and complex numbers.

106, H106 Calculus of One Variable I 4(4,0) Topics include analytic geometry, introduction to derivatives, computation and application of derivatives, integrals, exponential and logarithm functions. *Preq:* MTHSC 105, or a satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

108, H108 Calculus of One Variable II 4(4,0) Topics included are infinite series, limits, differentiation and techniques of integration. *Preq:* MTHSC 106.

115 Contemporary Mathematics for Elementary School Teachers I 3(3,0) Logic, sets, and the properties of the counting numbers, numeration systems. Open only to Elementary Education majors. *Preq:* Consent of instructor.

116 Contemporary Mathematics for Elementary School Teachers II 3(3,0) Continuation of MTHSC 115. Subtraction, properties of the integers, elementary number theory, rational number system, real number system. Open only to Elementary Education majors. *Preq:* MTHSC 115 or consent of instructor.

150 Introduction to the Mathematical Sciences 1(1,0) Lectures and discussions on the Mathematical Sciences disciplines: Actuarial Science, Applied Mathematics, Computing Science, Core Mathematics, Management Science, Operations Research, and Statistics.

203 Elementary Statistical Inference 3(3,0) A survey course in fundamental statistical principles with applications. Topics include estimation, test of hypothesis, regression and correlation, analysis of variance, and nonparametric statistics. *Preq:* MTHSC 101.

206, H206 Calculus of Several Variables 4(4,0) Topics include real valued functions of several variables, multiple integration, differential calculus of functions of several variables, vector field theory. *Preq:* MTHSC 108.

207 Multivariable Calculus 3(3,0) Introduction to the calculus of several variables. Topics include functions of several variables, differential calculus and optimization of several variables, multiple integrals and an introduction to difference equations. Topics from the management sciences will be used to illustrate the above concepts. *Preq:* MTHSC 102 or 106 with consent of instructor.

208, H208 Introduction to Ordinary Differential Equations 4(4,0) Introduction to the study of differential equations and their application to physical problems. Topics include exact, series, and numerical solutions; solutions by means of Laplace transforms; and solutions of systems of differential equations. *Preq:* MTHSC 206.

210 Applied Matrix Algebra 3(3,0) Introduction to the basic principles of matrix algebra with applications to the behavioral and managerial sciences. The major areas of application will include linear programming, directed graphs, and game theory. *Preq:* MTHSC 101 and 102 or 106.

215 Algebra for Elementary School Teachers 3(3,0) Linear equations and linear inequalities in one variable, functions and graphs, systems of linear equations and linear inequalities, quadratic equations, complex number system. Finite number systems, algebraic structures. Open only to Elementary Education majors. *Preq:* MTHSC 216.

216 Geometry for Elementary School Teachers 3(3,0) An informal treatment of the basic concepts of geometry. Open only to Elementary Education majors. *Preq:* MTHSC 116 or consent of instructor.

219 Introduction to Discrete Methods 3(3,0) Introduction to elementary methods of discrete mathematics with applications to computer science. Topics will include mathematical logic, methods of proof, program correctness, theory of sets, relations, functions, mathematical induction, closure operations, order relations, equivalence relations, and basic concepts of cardinal arithmetic. *Preq:* MTHSC 106 and 108.

231 Mathematics of Life Insurance 3(3,0) Introduction to the basic mathematics of finance and life insurance. Topics include compound interest, annuities certain, mortality tables, life annuities, net premiums, net level reserves, modified reserves, nonforfeiture values and dividends.

232 Actuarial Science Seminar I 1(1,0) A problem-solving seminar designed to prepare the student for the Society of Actuaries Examination I (General Mathematics). *Preq:* MTHSC 206.

301, H301 Statistical Theory and Methods I 3(3,0) Principal topics include elementary probability theory, discrete and continuous random variables, expected values, normal distribution, chi-square distribution, t-distribution, F-distribution, test of hypothesis, point and interval estimation, curve fitting. *Preq:* MTHSC 106 or 207 or 210.

308 College Geometry 3(3,0) Theorems and concepts more advanced than those of high school geometry. A treatment of the various properties of the triangle, including the notable points, lines, and circles associated with it. *Preq:* MTHSC 106.

311 Linear Algebra 3(3,0) Introduction to the algebra of matrices, vector spaces, polynomials, and linear transformations. *Preq:* MTHSC 108 or consent of instructor.

350 Introduction to Mathematical Models 3(3,0) A study of the modeling process which will include the translation of practical problems into mathematical models, the solution of the mathematical models, and the interpretation of the solution back into practical problems. Examples will be chosen from the physical, biological, social, and management sciences. *Preq:* CPSC 110, MTHSC 208, 301.

360 Intermediate Mathematical Computing 3(3,0) Continuing study of mathematical computing using the FORTRAN language. Emphasis on subroutine computation with applications to problems in science and engineering. *Preq:* CPSC 110 or consent of instructor.

402, H402, 602 Theory of Probability 3(3,0) Principal topics include combinatorial theory, probability axioms, random variables, expected values; special discrete and continuous distributions, jointly distributed random variables, correlation, conditional expectation, law of large numbers, central limit theorem. *Preq:* MTHSC 206, 301, or consent of instructor.

403, H403, 603 Statistical Inference 3(3,0) Principal topics include sampling distributions, point and interval estimation, maximum likelihood estimators, method of moments, least squares estimators, tests of hypothesis, likelihood ratio methods, regression and correlation analysis, introduction to analysis of variance. *Preq:* MTHSC 402.

404, 604 Introduction to Stochastic Processes 3(3,0) Principal topics include random variables, Markov processes, limiting distributions. Examples from scientific fields will be used in the construction of stochastic models of physical and behavioral phenomena. Applications to such topics as queuing, inventory, reliability, and decision analysis will be treated. *Preq:* MTHSC 402.

405, 605 Statistical Theory and Methods II 3(3,0) Principal topics include simple linear regression, multiple regression and correlation analysis, one-way analysis of variance, multiple comparison, multifactor analysis of variance, experimental design. Computation and interpretation of results are facilitated through use of statistical computer packages. *Preq:* MTHSC 301.

408, 608 Topics in Geometry 3(3,0) Introduction to topics in special geometries which include non-Euclidean space concepts, such as projective geometry, finite geometrics, and intuitive elementary topology. A brief introduction to vector geometry. *Preq:* MTHSC 206.

409, 609 Statistical Theory and Methods III 3(3,0) Principal topics include the analysis of enumerative data, nonparametric methods, sampling techniques, and time-series analysis. *Preq:* MTHSC 405 or consent of instructor.

412, H412, 612 Introduction to Modern Algebra 3(3,0) Introduction to the concepts of algebra. Topics included are the number system and the elementary theory of groups, rings, and fields. *Preq:* MTHSC 311.

415, H415 Introduction to Topology 3(3,0) An introduction to point set topology; Hausdorff, regular and normal spaces; metric, connected and compact spaces; continuous mappings and homeomorphisms. *Preq:* MTHSC 206.

419, H419, 619 Discrete Mathematical Structures I 3(3,0) This course applies theoretical concepts of sets, functions, binary relations, graphs, Boolean algebras, propositional logic, semigroups, groups, homomorphisms, and permutation groups to computer characterizations and design, words over a finite alphabet and concatenation, binary group codes, and other communication or computer problems. *Preq:* MTHSC 311.

420, 620 Discrete Mathematical Structures II 3(3,0) This course applies graph theory, ring and field theory, cardinality of sets, and difference equations of Nim games and other perfect information games, transport networks, shortest route problems, polynomial codes, Bose-Chandhuri-Hoquenghem codes, machine computability, mathematical linguistics, and different codes. *Preq:* MTHSC 412, 419, or consent of instructor.

425, H425 Orthogonal Functions and Boundary Value Problems 3(3,0) Continuation of MTHSC 208. Introduction to Fourier Series, numerical methods, partial differential equations, and certain special functions is given. *Preq:* MTHSC 208.

430, 630 Actuarial Finite Differences 3(3,0) Topics include finite differences, factorial polynomials Stirling's numbers, summation, Newton's interpolation formula, operators, collocation polynomials Lagrange's interpolation formula, divided differences, numerical (including Gaussian) integration singular integrals, and numerical solution of linear equations. *Preq:* MTHSC 206 or consent o instructor.

431, 631 Theory of Interest 3(3,0) A comprehensive treatment of the theory of interest from a con tinuous viewpoint. Topics include simple and compound interest, annuities certain, amortizatior schedules and sinking funds, and application of the theory to bonds and other securities. *Preq* MTHSC 430 or consent of instructor.

432 Actuarial Science Seminar II 1(1,0) A problem-solving seminar designed to prepare the studen for the Society of Actuaries Examination 2 (probability and statistics). *Preq:* MTHSC 403 may be taken concurrently or consent of instructor.

434, 634 Advanced Engineering Mathematics 3(3,0) Fourier series, Laplace and Fourier transform and numerical methods for solving initial value and boundary-value problems in partial differential equations are developed. Applications to diffusion wave and Dirichelet problems are given. Matrix methods and special functions are utilized. *Preq:* MTHSC 208.

435, H435, 635 Complex Variables 3(3,0) Elementary functions. Differentiation and integration of analytic functions. Taylor and Laurent series. Contour integration and residue theory. Conformal mapping. Schwartz-Christoffel transformation. *Preq:* MTHSC 206.

452, H452, 652 Linear Programming 3(3,0) An introduction to linear programming, using elementary matrix algebra and the theory of convex polygons. Applications to managerial problems, operations research, economic behavior, the theory of games and military strategy are considered. *Preq:* MTHSC 206 or consent of instructor.

453, H453, 653 Advanced Calculus I 3(3,0) Limits, continuity, and differentiation of functions of one and several variables, the Riemann integral, and vector analysis. *Preq:* MTHSC 206.

454, H454, 654 Advanced Calculus II 3(3,0) Continuation of MTHSC 453. Transformations, multiple integrals, line and surface integrals, infinite sequences and series, and improper integrals.

457, 657 Applied Mathematics I 3(3,0) Formulation and analysis of mathematical models of phenomena in the natural sciences. Probabilistic foundations of diffusion theory. Dimensional analysis, scaling, asymptotic series, and perturbation methods. Examples from biology, classical mechanics, and physical chemistry. *Preq:* MTHSC 425, 434 or 454.

458, 658 Applied Mathematics II 3(3,0) Continuation of MTHSC 457. *Preq:* MTHSC 457.

460, 660 Introduction to Numerical Analysis I 3(3,0) Introduction to the problems of numerical analysis emphasizing computational procedures and application. Topics include sources of error and conditioning, matrix methods, systems of linear equations, nonlinear equations, interpolation and appoximation by splines, polynominals, and trigonometric functions. *Preq:* MTHSC 206 or 207 and 360 or equivalent.

461, 661 Introduction to Numerical Analysis II 3(3,0) Continuation of MTHSC 460. Ordinary differential equations, boundary value problems, functional approximation, numerical solution of partial differential equations, and Monte Carlo techniques. *Preq:* MTHSC 208 and 460 or consent of instructor.

463, H463, 663 Mathematical Analysis I 3(3,0) Basic properties of the real number system, sequences and limits; continuous functions, uniform continuity and convergence. Integration, differentiation, functions of several real variables, implicit function theory. *Preq:* MTHSC 206.

464, H464, 664 Mathematical Analysis II 3(3,0) Continuation of MTHSC 463.

471, 671 Applied Statistical Decision Theory 3(3,0) An introduction to statistical decision theory emphasizing the Bayesian approach. Behavioral axioms, characterizing the "Rational decision maker," lead to the laws of probability theory and utility theory. Topics include axioms of subjective probability and utility, extensive and normal form analysis, likelihood principle, conjugate distributions. *Preq:* MTHSC 402.

81 Seminar in Mathematics 1-3(1-3,0) Attention will be focused upon mathematical areas in which onroutine problems can be posed with comparative ease. Emphasis will be upon independent tudy and student use of previously acquired mathematical skills. Open to students only by invitaion for not more than three hours credit.

01 Number Systems for the Elementary Grades 3(3,0)

02 Number Systems for the Middle Grades 3(3,0)

03 Modern Mathematics for Elementary School Teachers—Geometry 3(3,0)

05 Modern Mathematics for Elementary School Teachers—Algebra, Probability and Statistics 3(3,0)

10 Elementary Calculus from an Advanced Viewpoint 3(3,0)

12 Modern Algebraic Concepts 3(3,0)

21 Matrix Algebra I 3(3,0)

22 Matrix Algebra II 3(3,0)

25 Combinatorial Mathematics for Teachers 3(3,0)

30 Modern Geometry for Teachers 3(3,0)

31 Non-Euclidean Geometry 3(3,0)

32 Projective Geometry 3(3,0)

41 Introduction to Linear Programming with Applications 3(3,0)

51 Fundamental Concepts of Calculus I 3(3,0)

71 Numerical Methods in Secondary School Mathematics I 3(3,0)

81 History of Mathematics 3(3,0)

83 Theory of Numbers 3(3,0)

91 Mathematical Problems in the Curriculum 3(3,0)

00 Probability 3(3,0)

01 General Linear Hypothesis I 3(3,0)

02 General Linear Hypothesis II 3(3,0)

03 Stochastic Processes I 3(3,0)

04 Stochastic Processes II 3(3,0)

05 Data Analysis 3(3,0)

06 Nonparametric Statistics 3(3,0)

07 Applied Multivariate Analysis 3(3,0)

09 Time-Series Analysis, Forecasting and Control 3(3,0)

10 Mathematical Programming 3(3,0)

11 Nonlinear Programming 3(3,0)

13 Advanced Linear Programming 3(3,0)

14 Network Flows and Integer Programming 3(3,0)

15 Data Structures 3(3,0)

16 Graph Algorithms 3(3,0)

17 Stochastic Models in Operations Research I 3(3,0)

18 Stochastic Models in Operations Research II 3(3,0)

21 Real Analysis I 3(3,0)

22 Real Analysis II 3(3,0)

23 Complex Analysis I 3(3,0)

24 Complex Analysis II 3(3,0)

25 Ordinary Differential Equations I 3(3,0)

831 Fourier Series 3(3,0)
837 Calculus of Variations 3(3,0)
841 Applied Mathematics I 3(3,0)
842 Applied Mathematics II 3(3,0)
850 Computational Problems in Discrete Structures 3(3,0)
851 Abstract Algebra I 3(3,0)
852 Abstract Algebra II 3(3,0)
853 Advanced Linear Algebra 3(3,0)
854 Theory of Graphs 3(3,0)
855 Combinatorial Analysis 3(3,0)
856 Applicable Algebra 3(3,0)
861 Advanced Numerical Analysis I 3(3,0)
862 Advanced Numerical Analysis II 3(3,0)
863 Digital Models I 3(3,0)
864 Digital Models II 3(3,0)
867 Systems and Software 3(3,0)
868 Introduction to Numerical Processes 3(3,0)
891 Master's Research. Credit to be arranged.
901 Probability Theory I 3(3,0)
902 Probability Theory II 3(3,0)
907 Multivariate Analysis 3(3,0)
920 Introduction to Harmonic Analysis 3(3,0)
927 Functional Analysis I 3(3,0)
928 Functional Analysis II 3(3,0)
981 Special Topics in Mathematical Statistics 1-3(1-3,0)
982 Special Topics in Analysis 1-3(1-3,0)
984 Special Topics in Applied Mathematics 1-3(1-3,0)
985 Special Topics in Algebra 1-3(1-3,0)
986 Special Topics in Convexity 1-3(1-3,0)
987 Special Topics in Numerical Processes 1-3(1-3,0)
988 Special Topics in Operations Research 1-3(1-3,0)
991 Doctoral Research. Credit to be arranged.

MECHANICAL ENGINEERING (ME)

Professors: N. R. Bauld, Jr., E. H. Bishop, D. W. Bradbury, E. F. Byars, W. E. Castro, M. W. Dixon, J. L. Edwards, J. L. Gaddis, J. G. Goree, T. C. Hardin, J. C. Hester, E. H. Law, F. W. Paul, C. E. G. Przirembel, *Head;* M. K. Richardson, C. S. Rudisill, T. Yang; *Associate Professors:* A. C. Elrod, W. G. Hudson, C. O Huey, Jr., J. E. Jackson, Jr., J. A. Liburdy, B. K. Pearce; *Assistant Professor:* R. S. Figliola; *Visiting Assistant Professor:* I. Haque; *Adjunct Professors:* W. B. Fichter, T. S. Hargest, F. Rosa

201 Foundations of Engineering Design 2(2,0) The design process, design planning, engineering design analysis with emphasis on modern concepts and methods, design documentation, engineering professional ethics, patents, human factors, codes and standards. *Preq:* Sophomore standing. *Coreq:* EG 109.

202 Engineering Materials and Manufacturing Processes 2(2,0) Decision making in the selection of materials and processes for manufacturing products. Product design principles. *Preq:* ME 201. *Coreq:* CRE 310.

01 Engineering Systems Analysis 3(3,0) Application of undergraduate mathematics, numerical methods, and basic engineering principles in the solution of engineering problems. Problems will be drawn from dynamics, vibrations, kinematics, thermodynamics, heat transfer, fluid mechanics, electrical circuits and other engineering fields. *Preq:* MTHSC 208, Junior standing in engineering.

02 Dynamic Systems and Control 3(3,0) Model formulation of engineering systems based on physical laws involving the storage and transfer of matter and energy. Mechanical, electrical, fluid, and thermal systems are emphasized. Time and frequency response methods are considered. An introduction to control system characteristics of stability and feedback. *Preq:* EM 202, MTHSC 208.

04 Heat Transfer 3(3,0) Heat conduction in the steady and transient states, free and forced convection, radiation, combined modes, boiling and condensation. Analytical and numerical solutions to engineering heat transfer problems are emphasized. *Preq:* ME 301 and 311 or equivalent, MTHSC 208.

11, H311 Engineering Thermodynamics I 3(3,0) First and second laws of thermodynamics applied to engineering systems. Properties of the ideal and real gases and vapors. Processes and introduction to power and refrigeration cycles. *Preq:* MTHSC 208, PHYS 221, Junior standing.

12 Engineering Thermodynamics II 3(3,0) Continuation of ME 311. Power and refrigeration cycles, thermodynamic relations, compressibility charts, combustion, and introduction to equilibrium. *Preq:* ME 311.

13 Instrumentation and Measurements 3(2,3) Principles of measurements, instrument accuracy and performance characteristics. Modern instrumentation for measuring both static and dynamic pressure, temperature, fluid flow, speed, power, force, acceleration, etc. Uncertainty analysis, curve fitting, and technical report writing. Analog and digital computer methods for engineering experimentation. *Preq:* E&CE 307, Junior standing.

400 Senior Seminar 1(1,0) The seminars address the problems to be encountered by engineering graduates in professional practice. Invited lecturers as well as faculty provide the lectures and demonstrations. *Preq:* Senior standing.

401, 601 Design of Mechanical System Components 3(3,0) Principles of the analysis and synthesis of machines. The application of engineering principles and state-of-the-art of experimental knowledge to the selection of machine elements. *Preq:* EM 304.

402 Internship in Engineering Design 2(1,3) The student is given the opportunity to apply creatively his general knowledge of engineering in the analysis and design of one or more engineering systems, machines, or devices. A substantial portion of the design problem will involve applications of engineering economics. *Preq:* Senior standing. *Coreq:* IE 484 and ME 401.

404, 604 Control Systems Design 3(2,2) The analysis and design of feedback and control systems using principles of transient response, root locus, frequency response and state variable analyses. Experimental and analytic evaluation of laboratory control systems. *Preq:* ME 302 or equivalent.

405 Kinematics and Dynamics of Machinery 3(3,0) Graphical, analytical, and numerical techniques are used in the dynamic analysis and synthesis of machines. Emphasis on the application of the analysis techniques to linkages, cams, gears, and other mechanisms. *Preq:* EM 202 and Senior standing.

406, 606 Computer Control of Machines and Processes 3(2,2) Sampling and stability of discretized process models. Methods of Z-transforms, root locus and discrete time equations are employed for mathematical controller design and analysis. Computer requirements, transducers and signal converters are addressed. *Preq:* ME 404 or equivalent.

407, 607 Applied Heat Transfer 3(3,0) An application oriented extension of ME 304, considering topics in transient conduction, flow of fluids, energy exchange by radiation, and mass transfer. Applications in heat-exchanger design with emphasis on economics and variation of operating conditions from the design point. *Preq:* ME 304 and consent of instructor.

408, 608 Numerical Methods in Engineering Analysis 3(3,0) Techniques for solving engineeri problems utilizing numerical techniques and the digital computer. Polynomial interpolation fo mulas, numerical integration, roots of nonlinear algebraic equations, simultaneous linear equ tions, ordinary and partial differential equations. Simpson's rule, Gauss-Jordan, Gauss-Siede Newton-Raphson, Runge-Kutta, Milne, Hamming, and Crank-Nicholson methods. *Preq:* Seni standing.

409, 609 Design of Machine Elements 3(3,0) A design-oriented treatment of machine elements. rational approach to optimal design of shafting, springs, fasteners, clutches, brakes, gears, ar other machine elements. *Preq:* ME 401.

411, 611 Gas Power Systems 3(3,0) A study of the effects of variation in specific heat, some fund mentals of compressible flow, the combustion process, the chemical dissociation. The theoretic and actual processes associated with the gas turbine, the thermal jet, the thermal rocket, and th spark ignition and compression ignition engines are analyzed. *Preq:* ME 312.

412 Introduction to Compressible Flow and Turbomachinery 3(3,0) Introductory concepts to com pressible flow. Methods of treating one-dimensional gas dynamics including flow in nozzles an diffusers, normal shocks, and methods of measuring the velocity in compressible flow. Also include are theories of energy transfer and flow compressible fluid in turbomachinery. *Preq:* EM 320, ME 31

413 Thermal Systems Laboratory 1(0,3) Experimental investigations in such areas as internal com bustion engines, air-conditioning, refrigeration, steam turbines, steam condensers, etc. *Preq:* M 304, 312, 313.

414 Mechanical Systems Laboratory 1(0,3) Investigations of natural phenomena arising within th areas of dynamics, vibrations, and elasticity. Experiments include friction, photoelasticity, critica speed of shafts, frequency response, and others. *Preq:* EM 304. *Coreq:* ME 405.

415, H415 Undergraduate Research 1-3 Individual research projects to be conducted under th direct supervision and guidance of a faculty member. May be repeated for a maximum of si credits. *Preq:* Consent of instructor.

418, 618 Finite Element Analysis of Mechanical Engineering Systems 3(3,0) Introduction to th finite element method. Conventional and isoparametric elements. Numerical integration. Applica tions to heat transfer, fluid flow, and solids. Introduction to time-dependent and nonlinear solu tion methods. *Preq:* Senior standing in Engineering.

420, 620 Energy Sources and Their Utilization 3(3,0) Covers the availability and use of energy sources such as fossil fuels, solar (direct and indirect) and nuclear. Addresses energy density and constraints to use (technical and economic) for each source. *Preq:* ME 312.

421, 621 Conduction Heat Transfer 3(3,0) Analytical and numerical solutions of conduction heat transfer problems; steady one-dimensional systems; extended surfaces; steady two-dimensional systems; steady heat-source systems; transient systems, heating and cooling. *Preq:* ME 304 and Senior standing.

422, 622 Principles of Turbomachinery 3(3,0) The guiding principles underlying all forms of tur bomachinery. A unified treatment of turbomachinery to include pumps, fans, compressors and turbines. Dimensional analysis as applied to turbomachinery. Euler's equation, concepts of specified speed, thermodynamics of turbomachinery processes, the matching of the flow characteristics of duct systems with those of turbomachines, and related topics are covered. *Preq:* EM 320, Senior standing.

423, 623 Introduction to Aerodynamics 3(3,0) The basic theories of aerodynamics are presented with the purpose of accurately predicting the aerodynamic forces and moments which act on a vehicle in flight. *Preq:* EM 320, Senior standing.

429, 629 Thermal Environmental Control 3(3,0) Mechanical vapor compression refrigeration cycles, refrigerants, thermoelectrical cooling systems, cryogenics, thermodynamic properties of air, psychometric charts, heating and cooling coils, solar radiation, heating and cooling loads, insulation systems. *Preq:* ME 312.

430, 630 Fluid Power—Hydraulics 3(3,0) Engineering analysis of hydraulic system components and circuits. Topics covered will include hydraulic fluids, contamination and filtering, power generators, transmission lines, control valves, and system concepts. *Preq:* EM 320.

452, 652 Safety Engineering 3(2,3) Basic principles of industrial safety, inspections for safety compliance, design codes, design of machines and industrial equipment to meet safety standards, fire protection and control, safety laws and regulations, protective equipment. *Preq:* Senior standing.

493, 693 Selected Topics in Mechanical Engineering 1-6 A study of topics not found in other courses. *Preq:* Consent of instructor.

701 Applications of Engineering Analysis 3(3,0)

801 Foundation of Fluid Mechanics 3(3,0)

805 Heat and Mass Transfer I 3(3,0)

806 Heat and Mass Transfer II 3(3,0)

807 Mechanical Systems 3(3,0)

810 Macroscopic Thermodynamics 3(3,0)

811 Gas Dynamics 3(3,0)

812 Experimental Fluid Mechanics 3(3,0)

814 Turbulent Boundary Layer 3(3,0)

816 Energy Conversion 3(3,0)

817 Combustion Theory 3(3,0)

820 Modern Control Engineering 3(3,0)

821 Advanced Control Engineering 3(3,0)

830 Conductive Heat Transfer 3(3,0)

831 Convective Heat Transfer 3(3,0)

832 Radiative Heat Transfer 3(3,0)

833 Heat Transfer with Change of Phase 3(3,0)

841 Advanced Mechanical Engineering Design I 3(3,0)

842 Advanced Mechanical Engineering Design II 3(3,0)

845 Vibration of Continuous Media 3(3,0)

890 Engineering Project 1-3(0,3-9)

891 Master's Research. Credit to be arranged.

893 Selected Topics in Mechanical Engineering 1-6(1-6,0)

930 Advanced Topics in Heat Transfer 1-6(1-6,0)

931 Advanced Topics in Fluid Mechanics 3(3,0)

932 Advanced Topics in Thermodynamics 3(3,0)

991 Doctoral Research. Credit to be arranged.

MEDICAL TECHNOLOGY (MT)

Coordinator: M. B. Bishop

Anderson Memorial Hospital *Adjunct Professor:* E. E. Baillie; *Adjunct Associate Professor:* A. D. Pierce; *Adjunct Assistant Professor:* G. L. Huff

Greenville General Hospital *Adjunct Professor:* E. A. Dreskin; *Adjunct Associate Professor:* L. J. Minette; *Adjunct Assistant Professor:* S. Rawl

Self Memorial Hospital (Greenwood) *Adjunct Associate Professor:* C. H. Magruder; *Adjunct Assistant Professor:* R. E. Proctor

101 An Introduction to Medical Technology 1(1,0) An introduction to the operation and practices in a medical laboratory. This course is designed to integrate the academic year with the clinical year. Included will be lectures on current laboratory practices, a visit to a modern medical laboratory, current training of laboratory personnel and seminars on areas of specialization.

401 Immunology 3(2,4) Presents the principles of serology and immunology and the tests utilizing these principles to detect abnormalities helpful in the diagnosis of disease. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

402 Clinical Microbiology 8(4,11) The principles of microbiology: bacteriology, mycology, virology, and parasitology. Emphasis is placed on human pathogenic organisms, using both fresh and prepared organisms. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

403 Hematology and Hemostasis 5(3,7) Information on blood as a tissue, the theory of hematological and hemostasis (coagulation) tests, factors that affect test reliability. Knowledge of blood dyscraseas. Skill in the performance of hematological and hemostasis tests is emphasized and the use of automation techniques is covered. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

404 Blood Bank 4(2,6) History and principles of blood-group systems and methods of cross matching. Selection, pretesting, and bleeding of donors and processing of blood for transfusions, including component therapy. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

407 Urinalysis 2(1,3) The study of renal function together with principles of urine analysis and anatomy of the urinary system. Emphasis is placed on laboratory procedures and their utilization to detect abnormalities helpful in the diagnosis of disease. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

408 Clinical Chemistry 10(6,14) Chemical principles as applied to the analysis of biochemical substances and to physiological processes of clinical importance. Emphasis is placed on the chemistry of blood and urine. Advanced laboratory instruments, statistical analysis, and quality control concepts are covered. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

491 Special Topics in Medical Technology 3(2,4) Some or all of the following topics will be covered during the clinical experience: cell physiology, educational principles, laboratory management, scientific reports, research problems, etc. The manner in which the accredited hospital administers the special topics will vary somewhat due to the institutional differences. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

MICROBIOLOGY (MICRO)

Professors: O. W. Barnett, Jr., B. V. Bronk, E. L. Kline, L. L. Larcom, J. W. Lawson, M. J. B. Paynter, *Head;* F. J. Stutzenberger; *Associate Professors:* A. W. Baxter, S. S. Hayasaka; *Assistant Professor:* L. S. Donnelly; *Instructor:* L. E. Lindler; *Adjunct Professor:* F. T. Bayliss; *Adjunct Associate Professor:* H. F. Cantrell

100 Microbes and Human Affairs 1(1,0) An explanation of the roles of microorganisms in today's world and the significance of microbes to the future of mankind.

205 Introductory Microbiology 4(3,3) Basic concepts of microbiology are introduced through classroom and laboratory experiences. Emphasis is on practical applications in various areas of importance to man. Recommended for students not majoring in a biological science. Not open to Microbiology majors. *Preq:* CH 101 and 102, BIOL 103 and 104.

305, 605 General Microbiology 4(3,3) Morphology, physiology, classification, distribution, and cultivation of microorganisms and health. *Preq:* Introductory biology, CH 101, 102, or 112.

400, 600 Public Health Microbiology 3(3,0) The epidemiology of transmissible diseases including pathogenic characteristics of the infectious organism, modes of transmission, mechanism of infec-

tion, diagnostic aids, effective treatments, immunizing procedures and methods of preventing infection. *Preq:* MICRO 305.

401, H401, 601 Advanced Bacteriology 4(2,6) Metabolism, nutrition, growth, and death of bacteria; microbiological assays and industrial fermentation; emphasis on laboratory procedures for the identification of the more common taxonomic groups. *Preq:* CH 201 or 223, 227, MICRO 305.

403, 603 Marine Microbiology 3(2,3) A discussion of the microbes that inhabit the marine environment, their peculiar physiological traits, and contributions to the ecology of oceans. *Preq:* MICRO 305, Organic Chemistry.

407, H407, 607 Food and Dairy Microbiology 4(3,3) Physical-chemical factors limiting survival and growth of microorganisms during processing and manufacturing of food and dairy products. Standard methods for enumerating and identifying indicator bacteria, yeasts, molds and microbes producing food and foodborne illness. Starter cultures, fungal toxins, microbial cell injury and standards for food and dairy products. *Preq:* BIOCH 210 or CH 201 or 223, MICRO 305.

410, H410, 610 Soil Microbiology 3(2,3) The role of microorganisms in the decomposition of organic substances, transformation of nitrogen and mineral substances in the soil; interrelationships between higher plants and microorganisms; importance of microorganisms in soil fertility. *Preq:* MICRO 305.

411, H411, 611 Pathogenic Bacteriology 4(3,3) A study of pathogenic bacteria, their morphology, cultural requirements and classification; diagnostic tests, methods of differentiation, and the disease caused. *Preq:* MICRO 305.

412, H412, 612 Bacterial Physiology 4(3,3) A consideration of the cytology, physiology, metabolism, and genetics of bacteria. Included will be studies of growth and death, reproduction and mutation, nutrition and metabolic pathways, regulatory mechanisms, and effects of environment. *Preq:* CH 224, MICRO 305, one semester of biochemistry, or consent of instructor.

413, H413, 613 Industrial Microbiology 3(2,3) Microbial aspects of large-scale processes for the production of foods, antibiotics, enzymes, fine chemicals, and beverages. Topics include strain selection, culture maintenance, biosynthetic pathways, continuous cultivation and production of single cell protein. *Preq:* MICRO 305.

414, H414, 614 Basic Immunology 3(2,3) A consideration of the nature, production, and function of basic immune responses in animals. Procedures and mechanisms of antigen-antibody and other immune reactions. *Preq:* MICRO 305, Organic Chemistry.

415, H415, 615 Microbial Genetics 4(3,3) The cytological basis of bacterial, fungal, and viral genetics; molecular aspects; mutations; mechanisms of genetic transfers; episomes and plasmids; and population changes. *Preq:* CH 224, GEN 302 or 305, MICRO 305, or consent of the department head.

416, H416, 616 Introductory Virology 3(3,0) A general introduction to the field of virology, including animal, bacterial, and plant viruses. Topics will include nomenclature and classification, biochemical and biophysical characteristics, mechanisms of replication, chemotherapy, and techniques for isolation, assay and purification. *Preq:* MICRO 305.

417, H417, 617 Molecular Mechanisms of Carcinogenesis and Aging 3(3,0) Changes which occur at the cellular and subcellular levels during transformation and aging. Accumulated damage and "intrinsic clock" theories of aging; genetic and epigenetic theories of carcinogenesis; epidemiology of cancer; viral, radiation-induced and chemical carcinogenesis; the immune system and cancer. *Preq:* BIOCH 301, GEN 305 and MICRO 305, or consent of instructor.

491 Special Problems in Microbiology 1-3(0,3-9) Research problems in the various areas of microbiology designed to introduce undergraduate students to the planning and execution of research experimentation, and the presentation of research findings.

802 Bacteriological Technic 4(2,6)

803 Special Problems in Microbiology. Credit to be arranged.

804 Current Topics in Microbiology 1(1,0)

806 Pathogenesis and Infectious Disease 3(3,0)

807 Seminar 1(1,0)

810 Recombinant DNA and Genetic Engineering in Microbes 4(2,6)

811 Bacterial Cytology and Physiology 4(4,0)

812 Bacterial Metabolism 3(3,0)

815 Advanced Microbial Genetics 3(3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

MILITARY SCIENCE (MS)

Professor: R. B. Powell, *Head; Assistant Professors:* E. W. Cooler III, G. J. Graber, L. B Stancil, J. G. Stanley, Jr.

101 United States Army in Contemporary Society 1(1,1) This course examines the role of the Army in today's society, ranks and branches of the Army, principles and techniques of leadership, and military justice. Laboratory periods provide training in physical conditioning, mountaineering, and weapons safety and firing. One hour lecture per week; two hour laboratory every other week or equivalent.

102 Implications of World Events 1(1,1) Study of world change and military implication focusing on current events and an analysis of the specific problem areas throughout the world. Laboratory periods provide training in physical conditioning, mountaineering, weapons safety and firing, and land navigation. One-hour lecture per week; two-hour laboratory every other week or equivalent.

201 Fundamentals of Land Navigation and Military Symbols 1(1,1) Introduction to military maps, and terrain association. Leadership laboratory provides the student practical experience in applying principles of land navigation, confidence building, and physical-fitness testing. One-hour lecture per week; two-hour laboratory every other week or equivalent.

202 Military History (Basic) 1(1,1) A survey of military history with emphasis on battles and factors which have patterned our military structure today. Leadership laboratory provides practical experience in small unit leadership and physical fitness testing. One-hour lecture per week; two-hour laboratory every other week or equivalent.

203 Introduction to U.S. Military Equipment 1(1,1) A hands-on study of current weapons and equipment in use in the U.S. Army. Emphasis is on the mechanical functioning, maintenance, and operation of each item studied. One-hour lecture per week; two-hour laboratory every other week or equivalent.

301 Military Science (Advanced) 1(1,1) Small unit tactics: Analysis of the leader's role in directing and coordinating small units in the execution of offensive and defensive tactical missions. Cadets will enroll in one three-hour enrichment elective outside their major academic discipline. Cadets will participate in leadership laboratory training throughout the school year.

302 Military Science (Advanced) 2(2,1) Organizational leadership and methods of instruction. Study of relevant theories and concepts of organizational leadership and human behavior; techniques used in planning and presenting instruction. Continuation of leadership laboratory.

401 Military Science (Advanced) 1(1,1) A study of military operations, military teams, planning, and geography. Cadets will enroll in one three-hour enrichment elective outside their major academic discipline. Cadets will participate in leadership laboratory training throughout the school year.

402 Military Science (Advanced) 2(2,1) Analysis of selected leadership and management problems, military law, world change and military implications. Continuation of leadership laboratory.

MUSIC (MUS)

Professor: J. H. Butler, *Head; Associate Professors:* B. F. Cook, E. A. Freeman, L. Hochheimer; *Assistant Professor:* L. U. Harder; *Instructors:* W. W. Campbell, R. E. Goodstein; *Visiting Instructor:* W. C. Cottrell

151 Applied Music 1(1,0) Individual study in performance medium (voice, piano, flute, oboe, clarinet, saxophone, bassoon, cornet, trumpet, French horn, trombone, baritone, tuba, percussion). One hour-long private lesson each week, for which a minimum of four hours' practice is required. The student is guided in a continuing advance of his technical and artistic proficiency and is required to perform an appropriate solo in a student recital each semester. May be repeated for credit with departmental approval to allow for the study of differing performance media. *Preq:* Consent of instructor, based on a qualifying audition.

152 Applied Music 1(1,0) Continuation of MUS 151. *Preq:* MUS 151.

205 Music Theory 3(3,0) The terminology and notation of traditional music are reviewed, and the techniques of sight-singing and sight-reading are practiced. Harmonic practices are studied, relating to the principal diatonic triads in all inversions. *Preq:* Consent of instructor, based on musical literacy.

206 Music Theory 3(3,0) Continuation of MUS 205 with emphasis on secondary chord structure, modulation, and nondiatonic harmony. Advanced sight-singing and melodic dictation are practiced. *Preq:* MUS 205.

210 Music Appreciation: Music in the Western World 3(3,0) Designed to deepen the student's appreciation of his musical heritage through a study of the elements of the musical language and its development in Western culture.

251 Applied Music 1(1,0) Continuation of MUS 152. *Preq:* MUS 152 and consent of instructor.

252 Applied Music 1(1,0) Continuation of MUS 251. *Preq:* MUS 251.

305 Music Theory: Advanced Harmony 3(3,0) A study of harmonic usage involving chromaticism, free dissonance and atonality. Harmonic dictation is practiced. *Preq:* MUS 206.

306 Music Theory: Form Analysis 3(3,0) Principles of formal construction in music of all periods are studied by the inductive analysis of representative works. *Preq:* MUS 206.

311 Music Appreciation: American Music 3(3,0) Music in America from 1620 to the present. Indigenous and borrowed influences will be examined.

315 Music History 3(3,0) The development of Western music from antiquity to 1750, emphasizing representative literature from various styles and periods.

316 Music History 3(3,0) Continuation of MUS 315. Music from 1750 to present. *Preq:* MUS 315.

361 Marching Band 1(0,3)[1] *Ensembles:* Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time; may be repeated for credit, with a maximum of four hours of ensemble credit allowable toward a degree. Fall semester only. *Preq:* Consent of director.

362 Symphonic Band 1(0,3)[1] *Ensembles:* Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time; may be repeated for credit, with a maximum of four hours of ensemble credit allowable toward a degree. Spring semester only. *Preq:* Consent of director.

363 Jazz Ensemble 1(0,3)[1]S *Ensembles:* Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performance given periodically in addition to the minimum rehearsal time. May be repeated for credit, with a maximum of four hours' ensemble credit allowable toward a degree. *Preq:* Consent of director.

365 University Chorus 1(0,3)[1] *Ensembles:* Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in

[1]No more than a total of 4 semester credit hours earned in this group of courses (MUS 361, 362, 363, 365) may be used in meeting degree requirements.

addition to the minimum rehearsal time; may be repeated for credit, with a maximum of four hours of ensemble credit allowable toward a degree. *Preq:* Consent of director.

400 Music in the Elementary School Classroom 3(3,0) Designed to give the teacher in the elementary school a familiarity with music suitable for use with children at the elementary level. Recordings of appropriate music, preband instruments, unison and part singing will be included. No previous training in music is required.

401 Methods and Materials in Elementary School Music 3(3,0) Materials, methods and techniques in elementary school. *Preq:* MUS 400.

421 Vocal Arranging 3(3,0) Techniques of arranging for voices and accompanying instruments are studied and appropriate arrangements prepared. *Preq:* MUS 206.

422 Instrumental Arranging 3(3,0) Transpositions, characteristics and range of the instruments of the band and orchestra are studied. Techniques of arranging for small instrumental ensembles are studied and appropriate arrangements prepared. *Preq:* MUS 206.

NURSING (NURS)

Professors: A. M. Duvall, M. M. Lohr, G. A. Tanner; *Associate Professors:* M. A. Kelly, F. M. Oglesby, A. S. Prevost, L. Roswal, M. J. Wilhite, *Director; Assistant Professors:* E. M. Baines, M. F. Barber, B. C. Barham, C. L. Belcher, B. F. Campbell, M. F. Davis, D. A. Evers, J. H. Higgins, G. A. Kiser-Brown, P. M. Kline, M. A. Nicholson, A. B. Privette, C. Y. Schwartz, R. A. Spadoni, R. Thompson, S. W. Thompson; *Instructors:* C. C. Chernecky, L. R. Fisher, L. A. Hall, R. B. Hughes, R. A. Knight, R. H. Pruitt, P. W. Ramsey, J. K. Reid, P. M. Sellers, L. W. Wickliffe; *Lecturers:* R. H. Burley, D. L. Irvine; *Visiting Assistant Professor:* K. R. Jeanes; *Visiting Instructor:* E. J. Crowe

210 Introduction to Nursing I 3(2,3) Introductory nursing course offers a brief overview of the nursing process and interpersonal theory/communication theory. Learning experiences include the campus nursing laboratory and clinical agencies. *Preq:* ZOOL 222 or concurrent enrollment; Sophomore standing; or consent of instructor.

211 Introduction to Nursing II 3(2,3) Continuation of NURS 210 and expands utilization of nursing process; considers theoretical framework for practice and explores the effect of values on health care; focus on nursing diagnoses and nursing skills. *Preq:* NURS 210; NURS 230, MICRO 205, and/or ZOOL 223 or concurrent enrollment; or consent of instructor.

230 Professionalism in Nursing I 2(2,0) Analysis of the historical development of modern nursing. Consideration of nurses' professional roles in relation to health-care delivery systems, legal issues in nursing, nursing organizations, and influence of values in ethical decisions and nursing practice.

300 Seminar in Health Care Topics 1-4(1-4,0-9) Designed to provide individualized indepth study in a selected health-care area. May have a clinical component and/or special projects. Open to nonmajors. *Preq:* Consent of instructor.

309, H309 Human Values in Nursing 3(3,0) Through the spring 1984. Values guiding nursing theory and practice, including common human needs; the nature of man and his community.

310, H310 Perspectives in Nursing Intervention 3(3,0) Through the fall of 1983. Analysis of processes used in making nursing judgements. Emphasis on planning, intervention, and evaluation. *Preq:* NURS 309, 311, 313.

311 Nursing During Alterations in Life Patterns 5(2,9) Through the fall of 1983. Study of the ways in which people perceive and cope with changes in their life patterns; emphasis on the synthesis of knowledge from the arts and sciences as a basis for deliberative nursing action. Laboratory experience in a variety of settings with all age groups.

312 Nursing of the Acutely and Chronically Distressed 5(2,9) Through the spring of 1984. Nursing concepts based on a broad patho-psychophysiologic approach toward understanding changes in

he functions as a result of stress and/or disease. Laboratory experience in agencies providing care or the mentally and physically distressed. *Preq:* NURS 309, 311, 313.

313 Promotion of Health 3(2,3) Through the fall of 1983. Role of the nurse in the teaching of health n the home and in agencies concerned with the prevention of illness. Emphasis on nutrition as a positive approach to the improvement of health throughout the life cycle. Laboratory experience n clinics, homes, and selected community programs.

314 Nursing in the Home 3(2,3) Through the spring of 1984. The dimensions of caring for the ill in he home. Includes early detection, treatment, and the use of resources with emphasis on continuity of care. Laboratory experience with agencies providing home care. *Preq:* NURS 309, 311, 313.

320 Nursing During Alterations in Life Patterns I 2(2,0) A course that will focus on stress in childbearing clients, infants, children, and adolescents. Major emphasis will be pathophysiological and psychosocial concepts related to nursing care of these individuals in hospital settings. *Preq:* NURS 211; 321 or concurrent enrollment; or consent of instructor.

321 Promotion of Health I 2(2,0) Focus on childbearing clients, infants, children, and adolescents. Major emphasis on ways in which these individuals may achieve or maintain wellness in the family, home, and community environment. Identification of appropriate nursing strategies that enhance wellness in the community. *Preq:* NURS 211 or consent of instructor.

322 Clinical Nursing I 2(0,6) Explores stressors confronting the childbearing family, issues in parent-infant nursing, and the nurse's responsibility in working with individuals and families throughout the childbearing experience. *Preq:* NURS 211; 320 and 321 or concurrent enrollment; or consent of instructor.

323 Clinical Nursing II 2(0,6) Focus on nursing care of children of all ages and their families. Emphasis on alterations in health and needs specific to children and on working with parents to facilitate recovery. *Preq:* NURS 211; 320 and 321 or concurrent enrollment; or consent of instructor.

324 Clinical Nursing III 1(0,3) Clinical laboratory course that will focus on the use of the nursing process with childbearing and childrearing families in the community. Emphasis on optimum-level wellness. *Preq:* NURS 211; 321 or concurrent enrollment; or consent of instructor.

330 Professionalism in Nursing II 2(2,0) Introduction to research in nursing. Focus on analysis of reported research and epidemiological methods in nursing. Ethical, moral, and legal issues are discussed in relation to nursing research. *Preq:* EXST 301 or concurrent enrollment, or consent of instructor.

340 Nursing During Alterations in Life Patterns II 2(2,0) A study of the ways in which adults interpret and cope with changes in their life patterns throughout the adult age span. Emphasis on the crisis model and crisis intervention as a way to understand and assist clients with these changes. *Preq:* NURS 211; 341 or concurrent enrollment; or consent of instructor.

341 Promotion of Health II 2(2,0) Focus on the ways in which adults achieve or maintain health lifestyles in family and community settings. Nursing interventions are identified that enhance wellness in the adult and elderly client. Includes study of diverse lifestyle factors leading to increased or decreased well-being of the individual. *Preq:* NURS 211 or consent of instructor.

342 Clinical Nursing IV 2(0,6) Emphasis on the analysis of the health problems, coping behaviors, and health needs of adults of all ages and their families. Nursing practice in medical and surgical acute-care settings. *Preq:* NURS 211; 340, 341 or concurrent enrollment; or consent of instructor.

343 Clinical Nursing V 2(0,6) Focus on application of the nursing process in the care of mentally ill adults of all ages. Emphasis on understanding the complexity of human behavior. Opportunity to develop interpersonal process skills in depth in a one-to-one relationship with a mentally ill client. *Preq:* NURS 340 must be taken previously or concurrently.

344 Clinical Nursing VI 1(0,3) Focus on the use of the nursing process with adult and elderly clients in the community. Emphasis on achieving optimum level of wellness. *Preq:* NURS 211; 341 or concurrent enrollment; or consent of instructor.

413, H413 Complex Nursing Intervention I 4(1,9) Through the fall of 1984. A synthesis of knowled attitudes, and skills related to the care of individuals/families with health problems requiring co plex nursing interventions. Emphasis on diagnosis and intervention in the care of persons presenti into the health-care system with nursing problems resulting from illness states due to serio medical and surgical conditions. Laboratory experiences in diverse settings. *Preq:* NURS 310, 3 314.

414, H414 Complex Nursing Intervention II 4(2,6) Through the spring of 1985. A continuation NURS 413 with emphasis on nursing diagnosis and intervention in the care of individuals presenti into the health-care system, with nursing problems resulting from illness states due to multip trauma, conditions requiring external life support, and conditions resulting in residual function impairment. Laboratory experiences in diverse settings. *Preq:* NURS 413, 419, 421.

415 Promotion of Health III 2(2,0) Consideration of health promotion activities for community a population groups with emphasis on community assessment, screening, community planning, a health teaching/counseling. *Preq:* All 300-level nursing courses except NURS 300 and 330, or co sent of instructor.

416 Complex Clinical Nursing V 1(0,3) Practice in activities related to health promotion in popul tion groups. Laboratory settings include areas such as industries, schools, clinics, and other cor munity agencies and organizations. *Preq:* All 300-level nursing courses except NURS 300 and 33 415 or concurrent enrollment; or consent of instructor.

419 The Multiproblem Family 3(2,3) Through the fall of 1984. Focus on the family as a unit of car Use of the epidemiologic approach as a tool in understanding conditions influencing the famil Laboratory experience through community care facilities. *Preq:* NURS 310, 312, 314.

421 History and Philosophy of Nursing 3(3,0) Through the fall of 1984. Analysis of the developmer of modern nursing. Emphasis will be placed on how the nursing profession articulates with societ and the role of nurses as change agents. Consideration will be given to the legal and ethical impl cations in nursing practice. *Preq:* NURS 310, 312, 314.

422, H422 Current Research in Nursing 3(3,0) Through the spring of 1985. A study of approaches i problematic situations in nursing, with emphasis on interpretation of findings. *Preq:* NURS 41 419, 421.

426, H426 Independent Study in Nursing 4(2,6) Opportunity for indepth study in an area of specia interest in clinical nursing. Laboratory experience arranged. *Preq:* NURS 413, 419, and consent o instructor under whom student wishes to study.

430 Professionalism in Nursing III 2(2,0) The role of the nurse as a change agent using selecte leadership and nursing theories. Models for nursing-care delivery, quality assurance, and standard of nursing care are presented. *Preq:* NURS 230 and 330; MGT 307 or SOC 430 or concurrent enroll ment; or consent of instructor.

431 Care of the Hospitalized Child with Long-Term Illness 4(2,6) Role of nurse in caring for the chil with a long-term or terminal illness with emphasis on adaptations to meeting basic child needs Laboratory experience in facility providing hospitalization for children. Limited enrollment. *Preq* NURS 413, 419

432 Nursing Care of the Person in Crisis 4(2,6) Study of the person with an emotional crisis precipitated by either a physiological or psychological problem. Various theories concerning crisis situations and the nursing interventions necessary to deal with the person in crisis are presented Nursing laboratory experience in a variety of settings with all age groups. Limited enrollment. *Preq* NURS 413, 419.

434 Teaching Role of Nurse Practitioner 4(2,6) Study of the nurse's role in health teaching and application of principles of health promotion, maintenance, and restoration. Student selection of a variety of health teaching situations and development of learning resources. Laboratory experi ence in a variety of settings with all age groups. Limited enrollment. *Preq:* NURS 413, 419.

435 Care of Individuals with Complex and Critical Illness Problems 4(2,6) Comprehensive nursing care to individuals with complex and critical illness problems. Emphasis on care of individuals with neurological, respiratory, and cardiac problems; implications for first aid and emergency care. Laboratory experience in acute-care facilities. Limited enrollment. *Preq:* NURS 413, 419.

437 Introduction to School Health Nursing 4(2,6) Role of nurse in school health programs with emphasis on the health care of the school age child in his usual environment, the home and school. Laboratory experience through schools and community care facilities. Limited enrollment. *Preq:* NURS 413, 419.

438 Coordination in Nursing Care 4(2,6) This course is designed to reinforce and expand the knowledge and skills needed in the coordination of nursing care. Guided activities in planning, implementing, and evaluating skilled nursing in clinical laboratory in health-care agencies. Participation in and evaluation of activities relating to the delivery of nursing-care services are emphasized. Limited enrollment. *Preq:* NURS 413, 419.

439 Nursing of the Aged 4(2,6) Designed to assist the senior student in bridging and synthesizing concepts extracted from a variety of disciplines and applying them to the nursing process in assessing, diagnosing, planning, implementing, and evaluating the care of the aged individual residing in the community. Limited enrollment. *Preq:* NURS 413, 419, PSYCH 340, SOC 311.

440 Nursing Care of the High-Risk Maternity Client and Her Infant 4(2,6) An indepth study of the high-risk maternity client, her family, and the high-risk infant. Laboratory in a variety of clinical settings. Limited enrollment. *Preq:* NURS 413, 419, 421.

441 Nursing Problems Related to Clients Coping with Cancer 4(2,6) Designed for increasing awareness and knowledge of the multidisciplinary approaches in oncology and the role of the oncology nurse specialist, and to form a basis for viewing cancer problems within a framework for nursing research. Clinical focus is on the assistance indicated for individuals with cancer and their families. Limited enrollment. *Preq:* NURS 413, 419, 421.

442 Nursing in Community Health Settings 4(2,6) Provides opportunity for application of the nursing process with clients in various community settings. Consideration will be given to principles of management and leadership, planning care for given population groups, and nursing roles in specialized areas. *Preq:* NURS 413, 419.

450 Complex Nursing Intervention I 2(2,0) Pathophysiological, psychosocial intra-interpersonal focus on health problems related to acute and traumatic conditions. Emphasis is on the concepts of circulation, oxygenation, cellular dysfunction, and pain. *Preq:* All 300-level nursing courses except NURS 300 and 330, or consent of instructor.

451 Complex Clinical Nursing I 2(0,6) Clinical practice within an acute-care setting which allows the student to apply the nursing process in giving care to clients and/or families who are experiencing problems with pain and/or cellular dysfunction. Pharmacotherapeutics, nutrition, and discharge planning are considered. *Preq:* All 300-level nursing courses except NURS 300 and 330; 450 or concurrent enrollment; or consent of instructor.

452 Complex Clinical Nursing II 2(0,6) Clinical practice within the acute-care setting which provides experiences in assisting clients with health problems arising from alterations in circulation and oxygenation. Emphasis on utilization of nursing diagnoses within the trauma care-environment. *Preq:* All 300-level nursing courses except NURS 300 and 330; 450 or concurrent enrollment; or consent of instructor.

460 Complex Nursing Intervention II 2(2,0) Focus on health problems related to the need for external support or long-term rehabilitation. Consideration of homeostasis and compensation, sexuality, mobility, and ethics as they relate to life support. *Preq:* All 300-level nursing courses except NURS 300 and 330, or consent of instructor.

461 Complex Clinical Nursing III 2(0,6) Clinical practice in the acute care setting to assist clients and/or families with health problems arising from the need for external support to maintain health.

Consideration of pharmacological and mechanical support interventions. *Preq:* All 300-level nu ing courses except NURS 300 and 330; 460 or concurrent enrollment; or consent of instructor.

462 Complex Clinical Nursing IV 2(0,6) Clinical practice in assisting clients and/or families wi health problems requiring alternative methods for achieving activities of daily living. Participatic with interdisciplinary health team. *Preq:* All 300-level nursing courses except NURS 300 and 33 460 or concurrent enrollment; or consent of instructor.

701 Health Assessment 2(1,3)

801 Family Health Nursing 3(1,6)

804 Nursing Theory 2(2,0)

807 Nursing Research 3(3,0)

812 The Dynamics of Community Health 3(3,0)

815 The Promotion and Maintenance of Health 3(1,6)

827 Foundations of Nursing Education 3(3,0)

828 The College Teacher of Nursing 3(2,3)

831 Adult Nursing I 6(3,9)

832 Adult Nursing II 6(3,9)

833 Rehabilitative Nursing I 6(3,9)

834 Rehabilitative Nursing II 6(3,9)

835 Child Health Nursing I 6(3,9)

836 Child Health Nursing II 6(3,9)

837 Maternal-Infant Nursing I 6(3,9)

838 Maternal-Infant Nursing II 6(3,9)

840 Gerontological Nursing I 6(3,9)

841 Gerontological Nursing II 6(3,9)

889 Special Problems in Nursing 1-6(1-6,0)

891 Master's Research. Credit to be arranged.

NUTRITION (NUTR)

(See also courses listed under Animal Science, Biochemistry, Dairy Science, Fooc Science, and Poultry Science)

Professors: J. C. Acton, B. D. Barnett, R. F. Borgman, D. L. Cross, R. L. Edwards, L. T Frobish, D. M. Henricks, L. W. Hudson, J. E. Jones, J. H. Martin, C. V. Morr, G. D. O'Dell F. E. Pardue, G. C. Skelley, Jr., D. E. Turk, J. N. Williams II, W. P. Williams, Jr.; *Associate Professors:* J. A. Collins, D. L. Handlin, B. F. Jenny, J. C. McConnell, Jr.; *Assistant Professors:* A. B. Bodine II, M. M. Cody, R. G. Godbee II, M. E. Kunkel, D. V. Maurice

201 Introduction to Nutrition 3(3,0)S Principles of the nutrition of domestic animals and mar include sources, digestion, absorption, utilization and functions of nutrients; effects of dietary deficiencies; and nutrients required for maintenance, growth, reproduction, lactation, work, and egg-shell quality. *Preq:* BIOCH 210, CH 223, or consent of instructor.

401, H401, 601 Fundamentals of Nutrition 3(3,0)F Biochemical and physiological fundamentals of nutrition applicable to domestic animals and man. Considered are digestive processes, and absorption and metabolism of carbohydrates, lipids, proteins, water, minerals and vitamins. Energy metabolism and comparative anatomy and physiology of digestive systems are discussed. *Preq:* BIOCH 210, CH 223, or consent of instructor.

425, H425, 625 Nutrition and Dietetics 3(3,0) Study of the nutritional value of foodstuffs, the influence of food preparation techniques upon these values, and the development of diets to meet human nutritional requirements. Current concepts in the formulation of therapeutic diets for the treatment of the ill will be emphasized. *Preq:* NUTR 451 or equivalent.

51, H451, 651 Human Nutrition 3(3,0) Essentials of nutrition and principle nutritional deficiency onditions. Factors affecting adequacy of dietary intake, methods of determining nutritional atus, the development of nutrition standards, and recent advances in human nutrition. *Preq:* onsent of instructor.

52, H452, 652 Clinical Nutrition 3(3,0) A study of diseases of nutritional etiology and their treatent. The pathogenesis, symptoms, diagnosis, and principles of nutrition therapy of each of the alnutritive disease conditions will be discussed. *Preq:* NUTR 451 or equivalent.

01 Therapeutic Nutrition 3(3,0)

02 Public Health Nutrition 3(3,0)

03 Nutrition Education 3(3,0)

04 Food Service Systems 3(3,0)

05 Nutrition Practicum 1-6(0,1-6)

06 Nutrition for Teachers 3(3,0)

01 Topical Problems in Nutrition 1-3

08 Monogastric Nutrition 3(3,0)

09 Ruminant Nutrition 3(3,0)

12 Nutrition of Carbohydrates and Lipids 3(3,0)

13 Nutrition Techniques with Large Animals 2(1,3)

14 Nutrition Techniques with Laboratory Animals 2(1,3)

16 Amino Acids and Protein Nutrition 2(2,0)

18 Vitamins and Minerals 4(3,3)

51 Nutrition Seminar I 1(1,0)

52 Nutrition Seminar II 1(1,0)

91 Master's Research. Credit to be arranged.

91 Doctoral Research. Credit to be arranged.

HILOSOPHY (PHIL)

ssistant Professors: J. L. McCollough, W. A. Maker

01 Introduction to Philosophic Problems 3(3,0) A discussion of representative philosophical questions which arise from human thought and action. Characteristic topics are as follows: The Conditions of Knowledge; The Nature of Man; The Individual and Society.

02 Introduction to Logic 3(3,0) An introduction to methods of evaluating arguments. Simple valid rgument forms are given which can be joined together to produce the logical form of virtually ny argument. Informal fallacies may also be considered.

03 Philosophy and Current Issues 3(3,0) Consideration of selected contemporary issues of broad ocial and philosophical concern. Topics may include technology and the human condition, uman nature and social problems, and prospects for improving the human condition.

03 Philosophy of Religion 3(3,0) A critical consideration of the meaning and justification of eligious beliefs. Representative topics are as follows: The Nature and Existence of God; Religious nowledge; Religious Language; The Problem of Evil.

04 Moral Philosophy 3(3,0) A study of moral problems, their origin in conflicts between duty and esire, and alternative solutions proposed by classical and contemporary writers.

15 Roots of Western Philosophy 3(3,0) The origins and development of rationality as found in the ought of selected philosophers, such as Socrates, Plato, Aristotle, Augustine, and Aquinas.

16 Modern Philosophy 3(3,0) The development of the modern view as seen in major Western hilosophers of the 16th, 17th, and 18th centuries. The thought of Descartes, Spinoza, Leibniz, erkeley, and Hume may be considered to illustrate the development of rationalism and mpiricism.

317 Nineteenth Century Philosophy 3(3,0) The development of 19th century philosophy with emphasis on selected works of philosophers such as Kant, Hegel, Marx, Nietzsche, and Kierkegaard.

318 Contemporary Philosophy 3(3,0) A study of the dominant movements in Western philosophy today, particularly existentialism and analytical philosophy. The object is to acquire sufficient background for reading current philosophical or philosophically influenced literature.

325 Philosophy of Science 3(3,0) A philosophical study of problems generated by science, but which are not themselves scientific, such as what comprises a scientific theory, how scientists formulate theories and acquire knowledge, what if anything differentiates science from other ways of knowing what role concepts play in scientific knowledge, and whether scientific progress is rational.

344 Professional Ethics 3(3,0) A study of ethical issues arising in the work place. The specific field selected for each semester will be drawn from among studies in business, medicine, and law.

PHYSICS (PHYS)

Professors: B. B. Bookmyer, B. V. Bronk, P. B. Burt, *Head;* R. L. Chaplin, Jr., W. E. Gettys, J. L. Ging, H. W. Graben, F. J. Keller, L. L. Larcom, A. L. Laskar, J. P. McKelvey, J. R. Manson, D. P. Miller, M. G. Miller, J. R. Ray, M. D. Sherrill, M. J. Skove, E. P. Stillwell, Jr., C. W. Ulbrich, H. E. Vogel; *Associate Professors:* T. F. Collins, J. A. Gilreath, P. A. Steiner, R. C. Turner; *Assistant Professor:* P. J. Flower; *Lecturer:* W. L. Trikosko; *Visiting Professor:* R. C. Gentry; *Adjunct Professors:* R. R. Coltman, Jr., M. Lutsky, R. O. Rahn, T. J. Roper; *Adjunct Associate Professor:* J. L. Reid

101 Current Topics in Modern Physics 1(0,2) Demonstrations and lectures serving as an introduction to different areas of physics and astronomy will be presented by various members of the staff. These areas may include such topics as astrophysics, energy, relativity, and weather, as well as visits to the planetarium.

115 Classical Physics I 3(3,0) An introductory calculus-based physics course. This course covers such topics as vectors, statics and dynamics of particles, work and energy, elasticity, harmonic motion, hydrostatics and hydrodynamics. *Coreq:* A course in calculus.

116 Classical Physics II 3(3,0) Continuation of PHYS 115. This course covers such topics as temperature, heat flow, first and second laws of thermodynamics and their applications, solar position and energy flow, waves, acoustics, electricity, magnetism, and electric circuits. *Preq:* PHYS 115 or consent of instructor.

122, H122 Physics with Calculus I 3(3,0) The first of three courses in a calculus-based physics sequence. Topics include vectors, laws of motion, conservation principles, rotational motion, oscillations, and gravitation. *Coreq:* MTHSC 108.

200 Introductory Physics 4(3,2) Introduction to classical physics. Includes elements of mechanics, heat, electricity, and light. This course may not be substituted for PHYS 122 but may be substituted for PHYS 207, only with the approval of the Department of Physics and Astronomy. *Coreq:* MTHSC 105 or equivalent.

207 General Physics I 4(3,2) Introductory course for students who are not majoring in a physical science or engineering. This course covers such topics as mechanics, waves, fluids, and heat. *Coreq:* A course including algebra and trigonmetry.

208 General Physics II 4(3,2) Continuation of PHYS 207. This course covers such topics as electricity, magnetism, electromagnetic waves, optics, and modern physics. *Preq:* PHYS 207.

221, H221 Physics with Calculus II 3(3,0) Continuation of PHYS 122. Topics include thermodynamics, kinetic theory of gases, electric and magnetic fields, electric currents and circuits, and motions of charged particles in fields. *Preq:* PHYS 122.

222, H222 Physics with Calculus III 3(3,0) Continuation of PHYS 221. Topics include wave motion, electromagnetic waves, interference and diffraction, relativity, atomic particles, and atomic and nuclear structure. *Preq:* PHYS 221.

3 Physics Laboratory I 1(0,3) An introduction to physical experimentation on mechanical and ectrical systems. Oscillatory motion and resonance are emphasized. Calculators and computers e used in statistical treatment of data. *Coreq:* PHYS 221.

4 Physics Laboratory II 1(0,3) Experiments involve atomic, molecular, and nuclear systems. The ave-particle dualism of light and matter is emphasized. Calculators and computers are used in atistical treatment of data. *Coreq:* PHYS 222.

0 Physics of the Weather 3(3,0) A descriptive introduction to meterology. Includes atmospheric ermodynamics, solar radiation, heat budget, atmospheric circulation, force laws governing air otion, fronts, precipitation, synoptic prediction. Special topics of current interest such as the ffect of environmental pollution on weather, and the effect of weather on health are included.

5 Energy Sources for the Future 3(3,0) A study of possible sources of energy including fossil fuels, lar energy, nuclear energy, and their uses. The basic physical concepts, the economic feasibility, d environmental impact of the use of these sources of energy are discussed. *Preq:* One semester a physical science.

2 Physics of Music 3(3,0) An elementary, nontechnical study of the relationship between the ws of physics and the production of music for the music student or layman who wishes to derstand the physical principles of the art. Topics include mechanical and acoustical laws, harnic analysis, musical scales, sound production in instruments, physiology of hearing, etc.

0 Physics Research 1-3(0,3-9) This individual research project may be performed in any area of perimental or theoretical physics or astronomy. Work will be performed under the supervision a physics or astronomy faculty member. Project need not be original but must add to the stunt's ability to carry out research. May be repeated to a maximum of 6 credits. *Preq:* Consent of structor and minimum GPR of 3.0.

1, H321, 621 Mechanics I 3(3,0) Statics, motions of particles and rigid bodies, vibratory motion, avitation, properties of matter, flow of fluids. *Preq:* PHYS 221.

2, H322, 622 Mechanics II 3(3,0) Dynamics of particles and rigid bodies, Lagrangian and amiltonian formulations, vibrations of strings, wave propagation. *Preq:* PHYS 321 or consent of structor.

5, H325, 625 Experimental Physics I 4(2,6) Introduction to experimental modern physics, mearement of fundamental constants, repetition of crucial experiments of modern physics (Sternerlach, Zeeman effect, photoelectric effect, etc.). *Coreq:* PHYS 321 or consent of instructor.

6, H326, 626 Experimental Physics II 4(2,6) Continuation of PHYS 325.

0 (E&CE) Electric and Magnetic Fields I 2(2,0) See E&CE 340.

1, H341 (E&CE) Electric and Magnetic Fields II 2(2,0) See E&CE 341.

1 Senior Thesis I 1-3 A semioriginal project performed under the direction of a physics staff ember. Theoretical fields available include relativity, solid state, statistical mechanics, nuclear ysics, and astrophysics. Experimental work may be done in various areas of solid-state physics, tronomy, biophysics, and atmospheric physics. *Preq:* Three physics courses beyond General ysics.

2 Senior Thesis II 1-3 Continuation of PHYS 401.

7, H417, 617 Introduction to Biophysics I 3(3,0) Introduction to the application of physics to ological problems. Topics include a review of elementary chemical and biological principles, ysics of biological molecules, and fundamentals of radiation biophysics. *Preq:* MTHSC 206, HYS 221, or consent of instructor.

8, H418, 618 Introduction to Biophysics II 3(3,0) Continuation of PHYS 417. Further work in diation biophysics, cell population kinetics, and selected special topics such as membrane ophysics, control theory and molecular biophysics, muscle studies, irreversible thermodynamics biophysics, enzyme physics, etc. *Preq:* MTHSC 206, PHYS 221, or consent of instructor.

420, 620 Atmospheric Physics 3(3,0) A study of the physical processes governing atmospher phenomena. Topics include thermodynamics of dry and moist air, solar and terrestrial radiati processes, convection and cloud physics, precipitation processes, hydrodynamic equations motion and large-scale motion of the atmosphere, numerical weather prediction, atmospher electricity. *Preq:* MTHSC 108, PHYS 208 or 221.

432, H432, 632 Optics 3(3,0) This course covers a selection of topics, depending on the interest the student. Topics covered may include the formation of images by lenses and mirrors, design optical instruments, electromagnetic wave propagation, interference, diffraction, optical activit lasers, and holography. *Preq:* PHYS 221.

441, H441, 641 Electricity and Magnetism II 3(3,0) Topics covered include magnetic fields an energy, magnetic properties of materials, electromagnetic induction, ac circuit problems with vect methods and complex numbers, Maxwell's field equations with applications. *Preq:* E&CE (PHY 341 or equivalent.

446, H446, 646 Solid State Physics 3(3,0) An introductory treatment of the crystal structure of solic and the properties of solids which depend on crystal structure, free electron model of metals, ban theory of solids, Brillouin zones, crystalline defects and diffusion. *Preq:* PHYS 222 or consent o instructor.

452, H452, 652 Nuclear and Particle Physics 3(3,0) A study of our present knowledge concernin subatomic matter. The experimental results are stressed. Topics discussed include particle spectra detection techniques, Regge pole analysis, quark models, proton structure, nuclear structure, sca tering and reactions.

455, H455, 655 Quantum Physics I 3(3,0) Discussion of solution of the Schroedinger equation fo free particles, the hydrogen atom and the harmonic oscillator. *Preq:* PHYS 322, E&CE (PHYS) 341 or consent of instructor.

456, H456, 656 Quantum Physics II 3(3,0) Continuation of PHYS 455. Application of principles o quantum mechanics as developed in PHYS 455 to atomic, molecular, solid state and nuclea systems. *Preq:* PHYS 455.

457, H457, 657 Basic Health and Radiological Physics I 3(3,0) Topics discussed in this cours include a survey of nuclear physics, interaction of radiation with matter, biological effects of hig and low energy radiation, and uses of radiation for therapy and diagnosis. *Preq:* PHYS 321, E&C (PHYS) 341, or consent of instructor.

458, H458, 658 Basic Health and Radiological Physics II 3(3,0) Continuation of PHYS 457. Topic covered will include dosimetry and radiation protection, ultraviolet radiation effects, shieldin calculations, thermal effects, tracer use and kinetics, and ultrasonics. *Preq:* PHYS 457 or equivalent

460, H460, 660 Contemporary Physics for High School Teachers 3(3,0) Study of later development including the measurements of atomic particles. The formulation of new laws and the modifica tions of old ideas needed to describe the interactions of these particles. *Preq:* One year of Genera Physics or consent of instructor.

465, H465, 665 Thermodynamics and Statistical Mechanics 3(3,0) Study of temperature, develop ment of the laws of thermodynamics and their application to thermodynamic systems. An intro duction to low temperature physics is given. *Preq:* Six hours of physics beyond PHYS 222 or con sent of instructor.

473, H473, 673 X-Ray Crystalography 3(2,3) Study of crystal symmetry, elementary group theory X-ray diffraction by crystals. Experimental methods of goniometry, powder and single crystal dif fraction are used to determine structures and electron density distribution. Application of X-ra diffraction to chemical, physical, and metallurgical problems.

703 Modern Physics for High School Teachers 3(3,0)

711 Origins of Physical Science 3(3,0)

716 Experimental Physics for High School Teachers 4(2,4)

3 Weather Science for Science Teachers 3(3,0)
1 Methods of Theoretical Physics I 3(3,0)
2 Methods of Theoretical Physics II 3(3,0)
3 Advanced Thermodynamics and Statistical Mechanics I 3(3,0)
4 Advanced Thermodynamics and Statistical Mechanics II 3(3,0)
1 Classical Mechanics I 3(3,0)
2 Classical Mechanics II 3(3,0)
1 Electrodynamics I 3(3,0)
2 Electrodynamics II 3(3,0)
5 Solid State Physics I 3(3,0)
6 Solid State Physics II 3(3,0)
5 Seminar in Contemporary Physics 1-3(1-3,0)
0 Directed Activities in Applied Physics 1-6
1 Master's Research. Credit to be arranged.
1 Quantum Mechanics I 3(3,0)
2 Quantum Mechanics II 3(3,0)
6 Relativity 3(3,0)
1 Advanced Quantum Theory I 3(3,0)
2 Advanced Quantum Theory II 3(3,0)
1 Doctoral Research. Credit to be arranged.

LANT PATHOLOGY (PLPA)

ofessors: O. W. Barnett, Jr., L. W. Baxter, N. D. Camper, O. J. Dickerson, *Head;* W. Witcher, I. Zehr; *Associate Professors:* G. E. Carter, Jr., G. C. Kingsland, S. A. Lewis

1, H301 Plant Pathology 3(2,2)F, S The Principles of the interrelationships between plant thogens, their hosts, and the environment. Economically important plant diseases are used to ustrate these principles and the application of these principles to disease control. *Preq:* BIOL 103 d 105 or 110.

1, 651 Bacterial Plant Pathogens 3(2,3)S, Odd-numbered years. The nature, development, and ntrol of plant diseases caused by bacteria. Taxonomic considerations, host-parasite relations d techniques used in isolating, identifying, and preserving bacterial plant pathogens. *Preq:* ICRO 305, PLPA 301, or consent of instructor.

6, H456, 656 Plant Virology 3(3,0)S, Even-numbered years. Plant viruses with emphasis on their orphology, biochemistry, purification and transmission; symptoms resulting from virus infection; rus-vector relationships; and serological procedures. The importance and control of plant virus seases will be discussed. *Preq:* BIOL 103 and 105 or 110.

8, H458, 658 Plant Parasitic Nematodes 3(2,3)F, Odd-numbered years. Morphology and taxnomy of stylet-bearing nematodes and their relationship with plant diseases. *Preq:* BIOL 103, 104, 5, 106 or 110, 111.

0 Internship in Plant Pathology 1-5(0,8-40)
0 Advanced Plant Pathology I 3(3,0)
1 Advanced Plant Pathology II 3(3,0)
3 Fungal Plant Pathogens 4(3,3)
4 Physiological Plant Pathology 3(3,0)
5 Special Problems in Plant Pathology. Credit to be arranged.
7 Seminar 1(1,0)

808 Techniques and Methods in Plant Pathology I 1(0,3)

809 Techniques and Methods in Plant Pathology II 1(0,3)

811 Plant Disease Diagnosis I 1(0,3)

812 Plant Disease Diagnosis II 1(0,3)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

POLITICAL SCIENCE (POSC)

Professors: H. E. Albert, C. W. Dunn, *Head;* W. H. Owens, Jr., M. W. Slann; *Associate Pro*
fessors: E. M. Coulter, H. W. Fleming, Jr., M. A. Morris; *Assistant Professor:* S. H. Wainscot
Instructor: E. A. Dover, Jr.; *Visiting Assistant Professor:* W. B. Cody; *Adjunct Professor:* J. S
Thurmond

101 American National Government 3(3,0) An introduction to American National Government an
politics with an emphasis on the functions of governmental organizations, the behavior o
political parties and personalities, and the role of public opinion.

201 Introduction to Political Science 3(3,0) A basic introduction to the study, analysis, scope, an
sources of government. Emphasis is given to the comparative institutions of government, the inte
national relations of government, the theoretical conceptions man has entertained about goverr
ment, and analysis of the ways in which man has behaved in response to government.

300 Special Activities 1-3(0,1-3) This course encompasses special projects, approved by the depar
ment head, which involve students in research, simulation, internships, or other actions requirin
the study and application of political principles, and which are engaged in for at least on
semester or its equivalent.

302 State and Local Government 3(3,0) The structural features, functions, and legislative, executiv
and judicial processes of American state and local government.

321 General Public Administration 3(3,0) An introduction to public administration including th
elements of organization, personnel and financial management, administrative law, and adminis
trative responsibility. *Preq:* POSC 101 or consent of instructor.

341 Political Science Methodology 3(2,1) An introduction to political science methodology. Exami
nation of the different research settings and various techniques for collecting political data. A
critical review of the contemporary literature of political science. Laboratory training an
fieldwork in interviewing. Includes exercises in computer use for elementary quantitative analysi
of political data. *Preq:* MTHSC 101 and POSC 101 or the equivalent or consent of the instructor

351 Classical Political Thought 3(3,0) Political philosophy from the pre-Socratic period t
Machiavelli. *Preq:* POSC 201 or consent of instructor.

352 Modern Political Thought 3(3,0) The early theories of the nation state in the sixteenth centur
and the major political thinkers, problems and movements through the twentieth century. *Preq*
POSC 201 or consent of instructor.

361 International Politics 3(3,0) An introduction to foreign policy, international law, and interna
tional organizations. *Preq:* POSC 201 or consent of instructor.

371 Comparative European Politics 3(3,0) Major emphasis on the United Kingdom, France, Germany
and the U.S.S.R., with brief attention given to Italy and Switzerland. Current methods of compari
son will be studied and applied to the formal and informal functioning of these governments. *Preq*
POSC 101, 201 or consent of instructor.

372 Totalitarian Political Systems 3(3,0) Continuation of POSC 371. This course will deal specifically
with the Soviet Union as an example of totalitarian political systems, with references made to
Nazi Germany and the present Eastern European political systems. *Preq:* POSC 201 or consent of
instructor.

373 Third World Politics 3(3,0) A survey of policies and problems of development of Third World states and their implications for the United States.

379 Directed Study in Comparative and International Politics 3(3,0) Readings and research in comparative government and society and international affairs. *Preq:* Consent of instructor.

403 American Congress 3(3,0) An examination of the behavior and processes of decision making in the American Congress together with an analysis of the interaction among Congress and the executive and judicial branches of the national government. *Preq:* POSC 101.

405 The American Presidency 3(3,0) An examination of the organizational patterns, administrative behavior, and political forces in the Presidency with considerable emphasis on relations between the Presidency and Congress, the courts, and administrative regulatory agencies. *Preq:* POSC 101, or consent of instructor.

406 American Federal System 3(3,0) Examination of the intergovernmental relationships among national, state, and local governments in the United States with an emphasis on such subjects as administrative and fiscal relations in the federal system. *Preq:* POSC 101.

409, 609 Directed Study in American Institutions 3(3,0) Supervised reading and/or research in selected areas of American government. *Preq:* Twelve semester hours in political science and consent of instructor.

422, 622 Public Policy Analysis 3(3,0) Selected views of public administration and the problems involved. *Preq:* POSC 101 or consent of instructor.

423, 623 Municipal Administration 3(3,0) Interaction of political, technical, and administrative processes in urban America. *Preq:* POSC 101 or consent of instructor.

424, 624 Administrative Law 3(3,0) Examination of the legal principles governing procedures and policy making processes of administrative agencies with emphasis upon delegation of powers, elements of fair administrative procedure, and judicial review and control of administrative determinations. *Preq:* POSC 101.

425, 625 Grants and the Governmental Budgetary Process 3(3,0) Examination of the budgetary structures and processes at the national, state, and local levels of government. Special emphasis is devoted to grantsmanship, because state and local budgets depend heavily upon grants. Each student writes a grant proposal. *Preq:* POSC 101 or consent of instructor.

427, 627 Government Personnel Administration 3(3,0) Government personnel systems; current trends and problems; essentials of recruitment, classification, compensation, motivation, evaluation, training, and discipline. *Preq:* POSC 101 or consent of instructor.

428, 628 American Defense Policy Analysis 3(3,0) A study of the problems in formulating policies of national defense, examination of alternatives, consequences and effectiveness of current techniques in nuclear weaponry, guerrilla and conventional warfare. *Preq:* POSC 101 or consent of instructor.

432 American Constitutional Law I 3(3,0) A brief introduction to the judicial process followed by a detailed examination of leading cases pertaining to the judiciary, the Congress, the Presidency, and the federal system. *Preq:* POSC 101.

433, 633 American Constitutional Law II 3(3,0) An examination of the relationship of the individual to his government, focusing on the safeguards of liberty and property including freedoms of speech, press and religion, and criminal procedures. *Preq:* POSC 101.

434 The Judicial Process and Jurisprudence 3(3,0) Courts as political subsystems; judicial decision making; the development of public policy through the judicial process; theories of law and jurisprudence. *Preq:* POSC 101.

435 Administration of Justice 3(3,0) Examination of selected issues and questions adjudicated in the nation's courts with emphasis upon the manners in which the courts and related law enforcement agencies deal with problems of deviance under the criminal law; an evaluation from a social science perspective of the courts and these related agencies as arbiters in the resolution of conflicts under the law. *Preq:* POSC 101.

442, 642 Political Parties and Politics 3(3,0) A study of the historical development of political pa ties, and the role they play in the organization and functions of our national government, and th influence of politics in policymaking. *Preq:* POSC 101.

443 Public Opinion and Propaganda 3(3,0) This course examines the nature of public opinion, it social and political context, the social-psychological processes basic to it, the dynamics of its fo mation and change and its measurements. *Preq:* POSC 101 or consent of instructor.

453 American Political Thought 3(3,0) American political philosophy from the seventeenth centur to the present with an emphasis on political and social developments since the 1770s. *Preq:* POS 101 or consent of instructor.

454 Southern Politics 3(3,0) Southern politics since 1950 with emphasis upon the characteristics o sectional politics, decline of the one-party system, impact of desegregation and civil rights act vism, political resurgence of the South in the 1970s and its impact on national politics. *Preq:* POS 101.

462, 662 Peace and Order in International Relations 3(3,0) A survey of obstacles to and advances i law and order in international relations. *Preq:* POSC 101, 201 or consent of instructor.

463 United States Foreign Policy 3(3,0) Focus on foreign policy in its historical perspective, examin ing the decision-making process in foreign policy; evaluates contemporary American capabilities and analyzes specific issues. *Preq:* POSC 101, 201.

465 Foreign Policies of the Major Powers 3(3,0) A study in the foreign policies of the leading worl powers with special reference to the geographic, economic, historical and political determinant of each. A general introduction to the field of foreign policy. United States foreign policy is no emphasized. *Preq:* POSC 361 or consent of instructor.

475 Political Systems of Latin America 3(3,0) An examination of political processes in Latin America from both institutional and national perspectives. *Preq:* POSC 101, 201, or consent of in structor.

476 Political Systems of the Middle East 3(3,0) A comparative examination of the political pro cesses of the Middle East, emphasizing a socio-cultural approach to the problems of politica development. The overview of the course concentrates upon the Arab and non-Arab states o Jordan, Lebanon, Syria, the United Arab Republic, Iran, Israel, and Turkey. *Preq:* POSC 101, 201, o consent of instructor.

482 The Political Novel and the Cinema 3(3,1) A consideration of how political science is treated i political novels and cinema, and how political opinions are shaped by these media. *Preq:* POS 101, 201, or consent of instructor.

POULTRY SCIENCE (PS)

Professors: B. D. Barnett, *Head;* J. W. Dick, B. L. Hughes, J. E. Jones; *Associate Professor:* R. J. Thurston; *Assistant Professors:* G. P. Birrenkott, Jr., D. V. Maurice; *Visiting Professor:* M. A. Boone

201 Poultry Husbandry 3(3,0)F A study of the principles of poultry production and marketing and of the anatomy and physiology of the economically important poultry and game bird species. *Preq:* Consent of instructor.

323 Poultry and Poultry Products Evaluation 2(0,4) Selection of layers, broilers, and turkeys. Grading of poultry products according to USDA grade standards will also be studied. Students enrolled in this course are eligible to compete in Intercollegiate Poultry Judging Contests. *Preq:* PS 201 or consent of instructor.

355, 655 Poultry Products Grading and Technology 3(2,3)F, Even-numbered years. Factors important in the quality of poultry products are considered. The effects of production, handling, packaging and storage on consumer acceptability are discussed. Quality evaluation will be considered from the standpoint of tenderness, flavor, microbiology, and USDA grades.

)0, 600 Avian Physiology 3(3,0) Odd-numbered years. Detailed study of the structure and func-)n of organ systems of avian species with emphasis on digestion and reproduction. Students are ven an opportunity to study organ system(s) of their choice using quantitative physiological chniques. *Preq:* ANPH 301, PS 201, or consent of instructor.

)2, 602 Poultry Management 3(3,0) A continuation of PS 201 which emphasizes management, ecision-making and the application of technology to the commercial production of poultry and oultry products. *Preq:* PS 201 or consent of instructor.

)3, 603 Poultry Management Laboratory 1(0,3) Continuation of PS 402 which emphasizes prob-m solving, decision-making exercises, and familiarization with commercial poultry operations. *eq:* PS 201 and registration in 402, or consent of instructor.

)5, 605 Special Topics 1-4(1-3,0-3) Topics of interest to the student at undergraduate, graduate, nd professional levels. The course is designed to give experience with avain problems not covered other courses or on thesis research. Cumulative maximum of 4 credits. *Preq:* Consent of instructor.

)6, 606 Special Problems 1-3(0,3-9) Research problems of special interest to the student. The ourse is designed to give laboratory experience and concentrated study in an area not covered in epth in other courses. Cumulative maximum of 3 credits. *Preq:* Consent of instructor.

51, 651 Poultry Nutrition 2(2,0)F, Odd-numbered years. The nutrient requirements of chickens, rkeys, and game birds and methods of determining these requirements are discussed. Deficien-es and excesses of vitamins and minerals and the effects of naturally occurring toxins are con-dered. Hand formulation and linear programming are introduced.

53, 653 Poultry Nutrition Laboratory 1(0,3) A course to impart training in basic laboratory skills nd to familiarize students with common laboratory methods used in poultry nutrition.

54, 654 Least Cost Feed Formulation 1(0,2) Study of least cost formulation of animal diets. ncompasses development of ingredient composition tables, nutrient specifications, along with rmulation evaluation. Linear programming and computers are used. *Preq:* NUTR 201, 401, or PS 51.

58, 658 Avian Microbiology and Parasitology 4(3,3)F, Even-numbered years. Agents causing oultry diseases; the diagnosis, prevention, and treatment of specific diseases and their economic nd public health significance.

60, 660 Seminar 1(1,0)S, Odd-numbered years. Current research reported in journals covering the arious areas of avian science. Students practice interpretation of technical material for laymen. *eq:* Consent of instructor.

71 Practicum 1-4(0,2-9) Practical, supervised experience in an approved commercial organization ealing with poultry production, processing, or distribution. The student will submit monthly ports during the practicum and will conduct a departmental seminar at its conclusion. *Preq:* nior standing and consent of instructor.

)4 Poultry Pathology 3(1,6)

)5 Seminar 1(1,0)

)1 Master's Research. Credit to be arranged.

SYCHOLOGY (PSYCH)

rofessors: S. N. Cole, J. D. Davenport, E. H. Galluscio, *Head; Associate Professors:* L. Berger, I. Park, D. J. Senn; *Assistant Professors:* E. G. Brainerd, Jr., A. S. Dawes, R. A. Marcon, R. H. owaczyk, N. R. Schultz, Jr.; *Visiting Assistant Professors:* E. T. Chao, J. C. Wright, K. M. abrucky; *Visiting Instructor:* D. D. Moore

)1 Orientation to Psychology 1(1,0) A general orientation to the field of psychology with empha-s on areas treated within the discipline as well as interests which psychologists hold as individ-als. Not open to students who have taken PSYCH 201 unless permitted by the instructor.

)5 Psychology of Career Choice 1(1,0) Techniques of personnel selection, career development, nd vocational counseling as applied to the individual seeking a vocation. Topics to be discussed

include matching oneself to a job, how to apply for various jobs, and the measurement of job success.

201, H201 Introduction to Psychology 3(3,0) Introduction to the study of behavior. An analysis of the biological bases of behavior, learning, thinking, motivation, perception, human development, social behavior, and the application of basic principles to more complex phenomena such as education, personal adjustment, and interpersonal relations.

210 Introductory Experimental Psychology 3(3,0) Introduction to the research techniques employed in psychology. Emphasis is placed on different experimental designs, types of data collected in psychology, and procedures used in analyzing data.

211 Introductory Experimental Psychology Laboratory 1(0,3) Demonstrations and applications of principles of experimental methodology discussed in PSYCH 210. *Coreq:* PSYCH 210.

303 Psychology of Adjustment 3(3,0) A course in personal adjustment dealing with appropriate and inappropriate reactions to stress, frustration, and conflict. Consideration is given to practical coping skills and techniques for managing emotions, changing one's own behavior, and improving interpersonal relationships. Not included in the Psychology major. *Preq:* PSYCH 201 or consent of instructor.

306 Human Sexual Behavior 3(3,0) The subject of sexual behavior is to be approached from the psychophysiological, behavioral, and cultural points of view. Evolutionary, historical, and cross-cultural perspectives will be considered.

310 Advanced Experimental Psychology 4(3,3) Continuation of PSYCH 210 with an emphasis on conducting original research in the scientific study of human and animal behavior. Laboratory periods stress the refinement of techniques and the execution of research in a guided setting. *Preq:* PSYCH 201, 210, 211, or achievement of a satisfactory score on the departmental competency examination.

320 Principles of Behavior 3(3,0) Study of basic learning principles including classical conditioning, operant conditioning, and modeling. Initial emphasis is on animal studies followed by human applications and techniques. *Preq:* PSYCH 201, 210.

321 Principles of Behavior Laboratory 1(0,3) Laboratory work will include animal handling and training and applications of techniques from PSYCH 320. *Coreq:* PSYCH 320.

322 Sensation and Perception 3(3,0) A study of psychophysical techniques of measurement and sensory and perceptual processes related to vision, hearing, and the other senses. *Preq:* PSYCH 201, 210, and one 300-level psychology course, or consent of instructor. *Coreq:* PSYCH 323.

323 Sensation and Perception Laboratory 1(0,3) Selected experiments are conducted to demonstrate the phenomena involved in sensation and perception. *Coreq:* PSYCH 322.

330 Motivation 3(3,0) Various aspects of motivation are considered by studying physiological, emotional, and environmental influences on behavior. The orientation is empirical rather than theoretical with emphasis on pertinent research, applications, and measurement of motives. *Preq:* PSYCH 201.

333 Human Learning 3(3,0) Study of higher-order mental processing in humans. Topics include memory, learning of concepts, problem solving, and the psychology of language. *Preq:* PSYCH 201.

340 Life-Span Developmental Psychology 3(3,0) A survey of current theory and research concerned with the psychological aspects of human growth and development across the entire life span. Major topics include developmental methods, physical maturation, cognition, socialization, personality, psycholinguistics, intelligence, learning, behavior problems, and exceptionality. *Preq:* PSYCH 201.

343 Infancy to Young Adulthood 3(3,0) The emergence, growth, and change of behavior during the first two decades of human life. Special consideration will be given to the study of methodology and the beginning of perceptual abilities, intellectual capacities, language, social skills, and personality. Additionally, special problems of this period such as child abuse and behavioral disorders of children will be reviewed. *Preq:* PSYCH 201.

5 Adulthood and Aging 3(3,0) Special consideration of the major psychological processes of ag-g as they relate to individual behavior and adaptation. Included are the influences of aging on e body, learning and psychomotor skills, thinking and intelligence, employment and productivity, rsonality, and psychopathology. Opportunity for contact with institutionalized and noninstitu-nalized elderly persons is provided. *Preq:* PSYCH 201.

2 Social Psychology 3(3,0) A survey course analyzing human social behavior from the perspec-ve of the individual as a participant in social relationships. The major emphasis is on the study of ch contemporary social processes as attitude formation and change, interpersonal relations, nformity, conflict resolution, aggression and violence, social communication, and group phe-mena. *Preq:* PSYCH 201.

5 Environmental Psychology 3(3,0) A consideration of the influences of the physical environ-ent of human behavior. Topics include perception of and adaptation to the environment, effects physical design on behavior, and individual reactions to environmental stressors. *Preq:* PSYCH 1 or consent of instructor.

4 Industrial Psychology 3(3,0) Topics in personnel selection, including application forms, testing nd interviews, job analysis, performance appraisal, and achievement tests, the applied use of arning principles, supervisory training methods, discovery of training needs, motivation and orale in industry, consumer psychology, financial incentive plans, and organizational theories. eq: PSYCH 201.

0 Personality 3(3,0) Introduction to the area of personality theory emphasizing psychoanalytic, ehavioral, and humanistic approaches. Applications of personality theories to such topics as evelopment and adjustment are considered and research implications are evaluated. *Preq:* SYCH 201.

1 Applied Psychology 3(3,0) A study of the concepts of psychology as applied to individual, usiness, and professional behavior. *Preq:* PSYCH 201.

7 Skills in Human Relations 3(3,0) Application of the concepts of psychology to both individual nd professional behavior. A practical course which emphasizes training in human-relations skills nd improving the individual's ability to relate to other persons, particularly in psychological ser-ces and professions. *Preq:* PSYCH 201 or consent of instructor.

5, 615 Systems and Theories of Psychology 3(3,0) Study of the development of psychology par-cularly during the past 100 years. Emphasis on giving the student a better perspective of present-ay psychology. The focus is on the various approaches taken by influential psychologists and the nflicts among these approaches. *Preq:* PSYCH 201 and one 300-level psychology course or con-nt of instructor.

4, 624 Physiological Psychology 3(3,0) The study of human neuroanatomy with emphasis on the nctions of the nervous and endocrine systems. Discusses the biological basis of behavior in its rmal and abnormal dimensions. *Preq:* PSYCH 201 and one 300-level psychology course or con-nt of instructor. *Coreq:* PSYCH 425.

5, 625 Physiological Psychology Laboratory 1(0,3) Demonstrations and techniques of selected nysiological procedures are presented to explain the principles discussed in PSYCH 424. *Coreq:* SYCH 424.

9, 659 Group Dynamics 3(3,0) A review of current theory and research on small-group processes ith special emphasis given to group formation and development, group structure, the dynamic rces within a group, leadership, and group problem solving and decision making. *Preq:* PSYCH 1 and one 300-level psychology course or consent of instructor.

0, 670 Theories of Personality 3(3,0) An analysis of classical and contemporary theories of per-nality inlcuding Freudian, neo-Freudian, behavioristic, humanistic, and existentialistic theories. eq: PSYCH 201 and one 300-level psychology course or consent of instructor.

1 Psychological Testing 3(3,0) Introduction to the theory of psychological testing emphasizing ie principles of measurement and the characteristics of a good psychological test. The under-

standing of basic principles is applied to experiences in test development, administration, a interpretation. Measures of personality, interests, ability, aptitude, and achievement are c sidered. *Preq:* PSYCH 201 and 210 or consent of instructor.

483, 683 Abnormal Psychology 3(3,0) Study of the physiological, psychological, and cultural f tors involved in such behavioral disorders as transient situational disturbances, personality d orders, psychoneuroses, psychoses, and psychosomatic disturbances. Special emphasis is pla on the advantages and disadvantages of particular conceptual models in labeling and describ behaviors as either normal or abnormal. *Preq:* PSYCH 201 and one 300-level psychology cours consent of instructor.

488 Theories of Psychotherapy 3(3,0) A survey of alternative theories of psychological treatm for behavioral and emotional disorders. Various theoretical assumptions, techniques, and appl tions of each approach are examined and compared and case examples are considered. *Pr* PSYCH 201 and one 300-level psychology course or consent of instructor.

493 Practicum in Clinical Psychology 3(1,5) Students are given an opportunity to apply classro theory in solving individual and community problems through interaction with community ag cies and other professional groups in the mental health area. The student has limited but w controlled contact with actual clinical problems as they occur in the community environm *Preq:* Consent of instructor.

495 Practicum in Applied Psychology 3(1,5) Students are provided practical experience in the a of applied psychology. The student usually will be involved in a project designed to help solve industrial problem through a direct application of industrial or social psychology. *Preq:* Eit PSYCH 352 or 364 or 397 and consent of instructor.

497 Directed Studies in Psychology 2-4(2-4,0) Study of a particular topic under the direction o faculty member. Specific program is to be organized by the student and faculty member and s mitted to the department head for approval. May be repeated for a maximum of six credits. *Pr* PSYCH 310, one additional 300-level psychology course, and consent of instructor.

499, 699 Seminar Topics in Current Psychology 3(3,0) A seminar in current topics in psycholo Topics will change from semester to semester and will be announced prior to each semest registration. May be repeated once for credit, but only if a different topic is covered. *Preq:* PSY 201 and one 300-level course or consent of instructor.

RECREATION AND PARK ADMINISTRATION (RPA)

Professors: H. Brantley, *Head;* L. W. Gahan, G. E. Howard, R. W. McLellan, J. L. Stevens *Associate Professors:* R. H. Becker, G. W. Burnett, R. A. Conover, Jr., H. J. Grove, A. James, B. E. Trent, C. R. White, Jr.; *Assistant Professors:* R. L. Howell, F. A. McGuire, B. Mihalik, J. R. Pope, Jr., M. H. Wynn; *Lecturers:* C. P. Kriese, H. A. Thomas; *Visiting Ass tant Professors:* G. R. Boettner, M. K. McLellan

101 Introduction to Leisure Services 3(3,0) Introduces recreation professions and organizatio government, voluntary, and commercial. Overviews professional preparation. Outlines devel ment of man's uses of leisure and evolution of recreation, city parks, natural resources conser tion and preservation movements as philosophical forces affecting leisure services.

102 Issues in Leisure Services 3(3,0) Considers current trends, problems, laws, and issues affect by and/or affecting recreation in America.

203 Personal and Community Health 3(3,0) The course deals with health problems, disease prev tion and control, school health practices, public health administration, and other health inform tion which may enable one to live intelligently in today's complex society.

204 Sports in Recreation 3(2,3) Administrative and supervisory skills indigenous to public and private agency athletic programs are considered. Group instruction is given to individual and te sports, and officiating techniques applicable to these sports are taught.

05 Leisure Programs I 3(2,3) Principles and methods of program development. Time and facility tilization for sports activities, social functions, arts and crafts, outdoor activities, hobbies or pecial-interest groups, and activites in the cultural and performing arts will be pursued. *Preq:* RPA 01.

06 Leisure Programs II 1(0,3) Provides the opportunity for a student to conduct a recreation program in a supervised setting. A minimum of 90 hours with a leisure agency approved by the University is required. To be taken on a Pass-Fail basis only. *Preq:* RPA 205, Sophomore standing in ecreation and Park Administration.

07 Leisure Programs III 1(0,3) Continuation of RPA 206. Experience will be gained in a leisure tuation different from the RPA 206 exposure. A minimum of 90 hours with a leisure agency pproved by the University is required. To be taken on a Pass-Fail basis only. *Preq:* RPA 205, ophomore standing in Recreation and Park Administration.

01 Recreation and Society 3(3,0) The role of recreation in a technological and work-oriented ociety is investigated. Particular emphasis will be placed on recreation behavior, resources, and rogramming in public and private organizations which serve the public wants. Not open to tudents who have completed RPA 101 and 102.

02 Camp Organization and Administration 3(2,3) Surveys the development and trends of camping n America. Considers programming for the operations of agency and private camps. Enables tudents to master the techniques of group living. Laboratory offers practical experience in camp raft including trips and outdoor cooking.

05 Safety in Recreation 3(3,0) The course includes the physiology of exercise as it relates to ecreational sports and recreational activities, certification in first aid, and the beneficial effects f recreation. Safety aspects of recreational activities and risk recreation are also covered.

07 Park Maintenance and Operation 3(2,3) Maintenance techniques and materials. Job planning nd scheduling problems of overuse and preventive maintenance are included.

08, H308 Leadership and Group Processes in Recreation 3(3,0) Leadership is analyzed through xperience-based learning. Various styles of leadership and communication and their probable onsequences are examined. Techniques for planning of large and small group meetings are considered. Examination is made of literature in the field of leadership and group processes.

11 Therapeutic Recreation 3(3,0) Examination of the profession of therapeutic recreation by analyzing the history, philosophy, concepts, roles, and functions involved in the therapeutic recreation services.

20 Recreation Policymaking 3(3,0) Structures and processes for public park and/or recreation olicy formation in the United States.

21 Recreation Administration 3(3,0) An analysis of the internal organization of a recreation department dealing with finances and accounting, records and reports, publicity and public relations, state and federal legislation, staff organization, coordination of community resources. *Preq:* unior standing.

30, H330 Introduction to Environmental Interpretation 3(3,0) An introduction to the philosophy nd principles of the art of environmental interpretation. A comprehensive survey of interpretive heory as it applies to the recreation and parks practitioner and the varying settings within the rofession.

90 Special Projects in Recreation and Parks 1(1,0) Comprehensive studies and investigation of pecial topics not covered in other courses. Emphasis will be placed on field studies, community ervice and independent readings. May be repeated for a maximum of 3 credits. *Preq:* Junior standng and consent of instructor.

00, 600 Supervision of Recreation Personnel Patterns and Processes 3(3,0) A comprehensive study of the supervisory process in relation to individuals, programs, and groups in recreation agencies.

01, 601 World Geography of Recreation and Parks 3(3,0) Major international patterns in the provision and use of urban and rural park and recreation are examined.

402, 602 Campus Recreation 3(3,0) Study of the basic components required for administration of successful College Union and Intramural-Recreation Sport Programs.

403 Elements of Recreation and Park Planning 3(2,3) Basic recreation and park planning principles and processes, trends in area and facility development combine to form the basis for formulation of a relevant knowledge and philosophy of planning. *Preq:* Senior standing.

405 Field Training in Recreation 8(0,24) The student, in a ten-week program, has the opportunity to observe recreation programs in operation. The student will also have responsibilities of organizing and conducting activities under supervision. Maintenance and operation of facilities will be observed and practiced. Total of 360 hours required. To be taken Pass-Fail basis only. *Preq:* Senior standing in Recreation and Park Administration; grade-point ratio equivalent to Clemson University graduation requirement.

409 Methods of Recreation Research I 3(3,0) An analysis of the principle methods of recreation research, the application of descriptive statistics to recreation research, and the development of a research proposal. *Preq:* Senior standing.

410, H410 Methods of Recreation Research II 3(3,0) A continuation of RPA 409 to include the supervised execution and reporting of the results of the research proposal developed in RPA 409 and the application of inferential statistics to recreation research. *Preq:* RPA 409 or consent of instructor.

411, 611 Therapeutic Recreation for Selected Populations 3(2,3) Therapeutic recreation services for the mentally retarded, aging, and incarcerated populations. Emphasis is directed to planning services appropriate to the needs of clients and to the goals of the various agencies and institutions. *Preq:* RPA 311 or consent of instructor.

412, 612 Therapeutic Recreation and Mental Health 3(3,0) Therapeutic recreation services in mental health clinics, institutions, and outdoor settings. Review of disorders and current modes of treatment as they relate to therapeutic recreation. *Preq:* RPA 311 or consent of instructor.

413, 613 Therapeutic Recreation for Physically Disabled 3(2,3) Examination of the potential psychological, physical, and sociological implications of disability to the individual and to the planning and direction of therapeutic recreation services. *Preq:* RPA 311 or consent of instructor.

421, 621 Recreation Financial Resources Management 3(3,0) Analysis of recreation financial resources management. Deals with revenue sources and their allocation. *Preq:* RPA 321 and Senior standing in Recreation and Park Administration.

431, 631 Methods of Environmental Interpretation 3(2,3) Practice and instruction in the use of equipment and methods available to the interpreter in public contact work. Coaching in presentation and evaluation of live programs and in design, execution, and evaluation of mediated programs will be the major emphasis. Programs will be delivered to public audiences in the Clemson area. *Preq:* RPA 330, Senior standing in Recreation and Park Administration, or consent of instructor.

432, 632 Historic Site Interpretation 3(3,0) The development and implementation of the specialized interpretive programs required at historic sites. An overview of the historic movement in the United States and its presentation to the American people. *Preq:* RPA 330.

433, 633 Introduction to Museology 3(2,3) An introduction to the museum concept with insight into current museum practices. Course will include principles and methods of museum practice including conservation/restoration techniques. *Preq:* RPA 330.

441, 641 Commercial Recreation 3(3,0) Components of offering leisure services and products to the public by individuals, partnerships, and corporations for the purpose of making a profit.

442, H442, 642 Tourism 3(3,0) A survey of travel and tourism in the United States with focus on terminology, demographics, financial significance, and trends.

443, 643 Resorts in National and International Tourism 3(3,0) A variety of resort types are studied with respect to their development, organization, visitor characteristics, and environmental consequences. A case-study approach is used.

44, 644 Tour Planning and Operations 3(3,0) Provides the opportunity to understand the sychology of touring, with emphasis on packaged and group tours, and how tours of different ypes and scale are planned, organized, marketed, and operated. *Preq:* RPA 442 or consent of nstructor.

45, 645 Conference/Convention Planning and Management 3(3,0) Provides the opportunity to nderstand the problems of and solutions to conference and convention planning and manage- ient from both the sponsoring organization and facility manager's perspectives.

46, 646 Community Tourism Development 1-3(1-3,0) Provides a community-based perspective f the organizational, planning, development, funding, and operational needs for a successful ourism economy at the local level. *Preq:* RPA 442 or consent of instructor.

02 Group Processes in Leisure Services 3(3,0)

03 Seminar in Recreation and Park Administration 3(3,0)

04 Comprehensive Recreation Planning 3(3,0)

07 Principles of Environmental Interpretation 3(3,0)

08 Selected Topics 3(3,0)

09 Special Problems 1-3(1-3,0)

10 Current Issues in Recreation 1(1,0)

01 Philosophical Foundations of Recreation and Park Administration 3(3,0)

05 Recreational Aspects of Water Resources 3(3,0)

06 Urban Recreation Analysis 3(3,0)

11 Research and Evaluation in Recreation 3(3,0)

12 Leisure Services for the Elderly 3(3,0)

15 Therapeutic Recreation and Activity Therapy Administration 3(3,0)

20 Recreation Resource Policy Issues and Processes 3(3,0)

RELIGION (REL)

Associate Professor: C. H. Lippy; *Assistant Professor:* L. J. Greenspoon

00 Nature and Forms of Religious Experiences 3(3,0) The variety of religious experience and expression in human life.

01 The Old Testament 3(3,0) A survey of books of the Old Testament with special consideration given to the development of the concepts, institutions, and theology of the ancient Hebrews.

02 A Survey of New Testament Literature 3(3,0) A study of the books of the New Testament from the standpoint of their occasion, content, literary form, and basic theology.

06 Judaism 3(3,0) An examination of the development of Judaism from Biblical to modern times.

07 The Christian Tradition 3(3,0) An examination of the development of Christianity in Western civilization from the post-New Testament period to the present, stressing institutional growth and changes, theological currents, and the interaction of Christianity with culture.

08 Religions of the Ancient World 3(3,0) Selected religious movements in ancient Mesopotamia, Egypt, Canaan, and the Greco-Roman world with emphasis on movements outside the Judeo-Christian tradition.

09 Oriental Philosophies and Religions 3(3,0) A study of the philosophical and religious teachings of Hinduism, Buddhism, Confucianism, and Taoism.

10 Religion in the United States 3(3,0) The development of religion in the United States from the Colonial period to the 20th century. Attention will be devoted to analyzing broad currents in religious movements and religious thought which have given shape to the American pluralistic experience.

401 Studies in Biblical Literature and Religion 3(3,0) A critical examination of a selected topic in biblical studies. The topic will vary from year to year. May be repeated one time for credit. *Preq:* Consent of instructor.

402 Studies in Religion 3(3,0) A thorough examination of a selected topic in one or more of the religious traditions of the world or of religious life in a particular region. The topic will vary from year to year. May be repeated one time for credit. *Preq:* Consent of instructor.

RURAL SOCIOLOGY (RS)

Professors: B. H. Robinson, *Head;* E. L. McLean; *Associate Professor:* T. A. Lyson

301 Rural Sociology 3(3,0)F, S A study of human social relationships as influenced by life in the open country and in small towns and villages including considerations of the rural population, rural social institutions, processes of change in agricultural technology, and community area planning and development.

303 (SOC) Methods of Social Research I 3(3,0) See SOC 303.

359, 659 (SOC) The Community 3(3,0)F An examination of the sociological aspects of contemporary communities and of their growth and development. The structural relations of social class, status and power and the relationships among social institutions within the community are examined. Emphasis is placed on the organization and development of communities in a constantly changing environment.

371 (SOC) Population and Society 3(3,0) See SOC 371.

401, 601 (SOC) Human Ecology 3(3,0)S Analysis of the interrelationships between man and his natural and man-made environments; study of settlement patterns, social organizations, and institutions of human populations. Special emphasis will be given to interdependency of natural resources, human resources, and man-land relationships. *Preq:* Consent of instructor.

403, 603 (SOC) Methods of Social Research II 3(3,0) See SOC 403.

471, 671 (SOC) Demography 3(3,0) Demographic concepts, theory, and research methods for vital statistics, migration, and population distribution and projections; the collection and processing of demographic data, and the organization of demographic data systems. *Preq:* RS (SOC) 359.

495 (SOC) Field Experience 3(1,8) See SOC 495.

498 (SOC) Independent Study 3(1,6) See SOC 498.

881 Special Problems in Rural Social Research 3(3,0)

RUSSIAN (RUSS)

Lecturer: L. A. Savitsky

101, H101 Elementary Russian 4(3,1) Training in pronunciation, grammatical forms, and syntax with a view of giving the student the fundamentals necessary to read simple Russian texts. Three hours a week classroom instruction and one hour a week in the language laboratory.

102, H102 Elementary Russian 4(3,1) Continuation of RUSS 101. *Preq:* RUSS 101.

196 Practicum in Russian 1(0,1) An on-campus program of teaching foreign languages to children. Students work under the supervision of faculty in planning and teaching one 45-minute class per week to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year standing in language or consent of department head.

201, H201 Intermediate Russian 3(3,0) A brief review of RUSS 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of Russian prose in short stories and plays. *Preq:* RUSS 102.

202, H202 Intermediate Russian 3(3,0) Conversation, composition, and dictation based on readings of more difficult Russian prose than in the earlier courses. *Preq:* RUSS 201.

398 Directed Reading 1-3(1-3,0) Directed study of selected works in Russian. May be repeated for a total of six semester credits. *Preq:* RUSS 202 or equivalent and consent of department head.

SAFETY AND HEALTH (SH)

Assistant Professor: P. F. Petersen; *Instructor:* S. A. Schultz

201 Introduction to Safety and Health Management 3(3,0) Introduction to occupational safety, industrial hygiene, and fire protection, including hazard recognition and safety and health program management.

301 Industrial Accident Prevention and Loss Control I 3(3,0) Philosophies and techniques involved in development of accident prevention and loss control methods, procedures, and programs. The principles and concepts relating to the identification, appraisal, and correction of accident and loss-producing conditions.

302 Industrial Accident Prevention and Loss Control II 3(3,0) Continuation of SH 301. Technical aspects of industrial accident prevention and loss control. *Preq:* SH 301 or consent of instructor.

303 Introduction to Industrial Hygiene 3(3,0) The recognition of workplace stresses from chemical, biological, physical, and ergonomic agents; and the management of the potential risks through evaluation and control in the occupational environment. *Preq:* CH 102.

304 Industrial Hygiene Practice 4(3,3) Problems of evaluation and control of industrial exposure are considered. Sampling theory, study design, and survey technique are discussed. Control principles are presented. Instrument calibration, field sampling, and data interpretation will be investigated in the laboratory. *Preq:* SH 303 or consent of instructor.

401 Fundamentals of Fire and Explosion 3(3,0) The first of a two-course sequence will present the theory of combustion, principles of detection, and fundamentals of control agents. Products of combustion and the response of humans and building materials are discussed. *Preq:* SH 302, 303, or consent of instructor.

402 Fire Protection and Prevention 3(3,0) Analysis of fire safety problems; design of adequate protection and prevention measure; and concentration in the areas of construction, occupancy, exposure, and protection as they apply to the industrial environment. *Preq:* SH 401.

404 Seminar in Safety and Health 3(3,0) Directed readings and reports on recent advances or issues concerned with safety and health. Issues of ethics, policy, costs, and relations among business, society, labor, and government are stressed. *Preq:* SH 304, 401. *Coreq:* MGT 415.

410 Safety in Building Construction 3(3,0) The fundamentals of accident prevention and the Occupational Safety and Health Act as they apply to the planning, design, and construction stages of construction projects.

SOCIOLOGY (SOC)

Professors: F. A. Burtner, R. J. Knapp, R. F. Larson, *Head; Associate Professors:* K. W. Crader, L. G. Peppers, C. M. Sieverdes, M. F. White; *Assistant Professors:* S. S. Brown, H. M. Clark, C. A. Hope, R. G. Stover, D. K. Sturkie III, W. M. Wentworth, M. E. White

201 Introduction to Sociology 3(3,0) The sociological perspective: study of contemporary groups, organizations, and societies in terms of human social behavior, social change, social structure, and social institutions.

202 Social Problems 3(3,0) Social problems involving the family, education, health care, political and legal systems, economy, population, environment, community; and special problems associated with age, economic, racial, status, and gender inequality.

303 (RS) Methods of Social Research I 3(3,0) Introduction to methods of social research: research design, sampling, measurement, reliability, and validity; the relationship between theory and research. Required of all Sociology majors. *Preq:* SOC 201.

310 Marriage and Intimate Relationships 3(3,0) An examination of mate selection, living together, marital relations, family planning, conflict resolution, divorce and remarriage, later life adjustments, and singlehood as a life-style in the United States. *Preq:* SOC 201 or consent of instructor.

311 The Family 3(3,0) A cross-cultural analysis of the family as a basic social institution; the history, structure, and functions of the family in various cultures; and effects of social change on the family. *Preq:* SOC 201.

330 Industrial Sociology 3(3,0) Industry as social organization, the factory as a social system, personality in industrial relations, power groupings within industry, and industry and the community. *Preq:* SOC 201.

331 Urban Sociology 3(3,0) Urbanization as a social process and related changes in work, family structure, social mobility, life-style, technology, and development of cities in the future. *Preq:* SOC 201.

350 Socialization and Interpersonal Behavior 3(3,0) The effects of society upon interpersonal behavior; topics include socialization, self-concept, attitude formation and change, interpersonal attraction, and social power and influence. *Preq:* SOC 201.

351 Collective Behavior 3(3,0) Spontaneous, transitory, and sporadic group behavior: crowds, panics, riots, fads, and social movements. *Preq:* SOC 201.

359, 659 (RS) The Community 3(3,0) See RS 359.

371 (RS) Population and Society 3(3,0) The social, economic, and political consequences of population structure and change, including problems of food and resources, as well as population goals and policies in developing countries and the United States. *Preq:* SOC 201.

380 Introduction to Social Services 3(3,0) Fundamentals of casework practice, including philosophy and values, models of group work and ethics in social services work. *Preq:* SOC 201.

381 Social Service Delivery Systems 3(3,0) The delivery of social services; social service agencies; community action; social service planning, policy, and evaluation; and future trends in social services delivery. *Preq:* SOC 380.

382 Child and Family Welfare 3(3,0) The societal contexts of problems affecting children and their families, including the legal status of family members, family violence, neglect, runaways, child care, and teenage pregnancy. *Preq:* SOC 201.

383 Sociology of Death 3(3,0) Death and dying as social processes, including bereavement, death as social behavior, attitudes toward death, and mechanisms for coping with death, suicide, and euthanasia. *Preq:* SOC 201.

390 Sociological Approach to Law Enforcement 3(3,0) A sociological analysis of contemporary law enforcement in the overall criminal justice process. *Preq:* SOC 201.

391 Sociology of Deviance 3(3,0) Patterns of deviant behavior: subcultures, careers, and life-styles of deviants; deviance theory and research. *Preq:* SOC 201.

392 Juvenile Delinquency 3(3,0) The nature, extent, and causes of juvenile delinquency; societal attempts to control delinquent conduct and gang violence; emergence of the juvenile justice system. *Preq:* SOC 201.

393 Criminology 3(3,0) The nature, and causes of criminal behavior; societal attempts to control crime; social responses to crime, criminals, and the criminal justice system. *Preq:* SOC 201.

394 Sociology of Mental Illness 3(3,0) Mental illness as a social phenomenon, including cultural and social influences, organizational settings of mental health care delivery, legal issues, patient-therapist relationships, and mental illness intervention as social control. *Preq:* SOC 201.

395 Sociology of Alcohol and Drug Abuse 3(3,0) Social issues involved in alcohol and drug abuse, including the assessment of sociological theories of drug abuse, addiction, and prevention; societal problems associated with the misuse of alcohol, narcotics, and other drugs. *Preq:* SOC 201.

401, 601 (RS) Human Ecology 3(3,0) See RS 401.

403, 603 (RS) Methods of Social Research II 3(3,0) Advanced methods in social research; consideration of various techniques, methodological approaches, and research designs; laboratory experience in various phases of research. *Preq:* SOC 201, RS (SOC) 303 or consent of instructor.

404, 604 Sociological Theory 3(3,0) A survey of the development of sociological theory. Required of all Sociology majors. *Preq:* SOC 201.

430, 630 Sociology of Organizations 3(3,0) The analysis of administrative organizations and voluntary associations; applied analysis of their formal and informal group relations, communications, and effectiveness. *Preq:* SOC 201.

431 Social Stratification 3(3,0) Class, status, and power in society; class differences in behavior, values, and social mobility. *Preq:* SOC 201.

432 Sociology of Religion 3(3,0) A sociological analysis of religious systems and movements and their influence on other social institutions. *Preq:* SOC 201.

440, 640 Sociology of Leisure 3(3,0) Leisure in contemporary society, structural determinants of leisure activities, leisure as social control, and the future of leisure. *Preq:* SOC 201.

441, 641 Sociology of Sport 3(3,0) Sport as a social phenomenon; emphasis on leadership, discrimination, socialization, communication, conflict, and cooperation in sport; emerging social issues in contemporary sports. *Preq:* SOC 201.

460 Racial and Ethnic Relations 3(3,0) Racial and ethnic minorities in the United States, including the nature and causes of prejudice, discrimination, intergroup tensions, and conflict. *Preq:* SOC 201.

461 Sociology of Sex Roles 3(3,0) Female and male socialization; changes in statuses, roles, and opportunities in contemporary society, with cross-cultural comparisons. *Preq:* SOC 201.

471, 671 (RS) Demography 3(3,0) See RS 471.

480, 680 Medical Sociology 3(3,0) Sociocultural factors in the etiology and treatment of physical illness; medical occupations and professions; the organization of health-care delivery systems. *Preq:* SOC 201.

481, 681 Sociology of Aging 3(3,0) Theories of aging; influence of aging populations on health care, welfare programs, and retirement systems; special problems of early retirement. *Preq:* SOC 201.

490, 690 Rehabilitation Systems 3(3,0) Institutional and community-based systems of rehabilitation and reintegration of persons involved with crime, delinquency, alcohol, drug, emotional difficulties, and other stigmatizing characteristics. *Preq:* SOC 201.

495 (RS) Field Experience 3(1,8) Students participate in selected field placements under supervision for eight hours weekly and in a one-hour seminar per week. May be repeated once for credit. Graded on a pass/fail basis. *Preq:* SOC 381 or 390 and consent of department head.

498 (RS) Independent Study 3(1,6) Individual readings or projects in sociological areas not covered in other courses. A written proposal must be approved by the instructor directing the work and by the department head prior to registration. *Preq:* Consent of department head.

499 Seminar in Selected Topics in Contemporary Sociology 3(3,0) Sociological areas of current interest will be explored. May be repeated by special arrangement for a maximum of six credits. *Preq:* Consent of department head.

SPANISH (SPAN)

Professor: G. J. Fernandez; *Associate Professors:* L. T. Perry, M. M. Sinka; *Assistant Professors:* B. G. Durham, P. R. Heusinkveld, S. C. King, R. F. Mixon, L. E. Seamon, J. M. Whitmire; *Lecturer:* E. G. Fernandez

101, H101 Elementary Spanish 4(3,1) A course for beginners in which the essentials of grammar are taught and a foundation is provided for a conversational and reading knowledge of the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

102, H102 Elementary Spanish 4(3,1) Continuation of SPAN 101.

196 Practicum in Spanish 1(0,1) An on-campus program of teaching foreign languages to children. Students work under the supervision of faculty in planning and teaching one 45-minute class per week to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year language standing or consent of department head.

198 Situational Spanish 4(3,2) An intensive course relating to a student's field of study. Designed primarily for non-Liberal Arts majors preparing for employment or study abroad. Subsequent placement into SPAN 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements.

199 Situational Spanish 4(3,2) Continuation of SPAN 198. Subsequent placement into SPAN 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements. *Preq:* SPAN 198 or consent of instructor.

201, H201 Intermediate Spanish 3(3,0) A brief review of SPAN 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of Spanish prose in short stories and plays. *Preq:* SPAN 102.

202, H202 Intermediate Spanish 3(3,0) Introduction to Spanish literature: representative short stories, essays, novels, poetry, and plays. *Preq:* SPAN 201.

205 Elementary Spanish Conversation and Composition 3(3,0) Intensive oral and written training in Spanish through conversation groups, speeches, written compositions, and controlled vocabulary acquisition. Required of all Spanish majors and minors. May be taken concurrently with SPAN 202, 303, or 311. *Preq:* SPAN 201.

299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three semester credits. *Preq:* Consent of instructor directing the play.

303 Survey of Spanish Literature I 3(3,0) Literary movements, influences, and authors from the beginnings to the end of the seventeenth century. Representative works, discussions. Required of Spanish majors. *Preq:* SPAN 201, 202.

304 Survey of Spanish Literature II 3(3,0) Literary movements, influences, and authors from the eighteenth century to the present. *Preq:* SPAN 201, 202.

305 Intermediate Spanish Conversation and Composition I 3(3,0) Practice in spoken Spanish with emphasis on vocabulary, pronunciation, intonation, and comprehension. Some written work to increase accuracy. Assignments in the language laboratory. *Preq:* SPAN 202 or consent of department head. Required of Spanish majors.

306 Intermediate Spanish Conversation and Composition II 3(3,0) A continuation of SPAN 305 with more emphasis on written Spanish. *Preq:* SPAN 305 or consent of department head.

307 Spanish Civilization 3(3,0) A study of the significant aspects of the culture of Spain from its origins to the present. *Preq:* SPAN 202 or consent of department head.

308 Spanish-American Civilization 3(3,0) A study of the significant aspects of the culture of Spanish-American countries from the pre-Colonial period to the present. *Preq:* SPAN 202 or consent of department head.

311 Survey of Spanish-American Literature 3(3,0) Literary movements, influences, authors, and works from the Colonial period to the present. *Preq:* SPAN 202 or consent of department head.

398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Spanish literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department head.

401 Modern Spanish Literature 3(3,0) The generation of 1898 to the Civil War: Readings from Unamuno, Azorin, Valle-Inclan, Antonio Machado, Ortega Y Gasset, Garcia Lorca, and Alejandro Casona. *Preq:* SPAN 303, 304, or 311.

402 Contemporary Spanish Literature 3(3,0) Spanish literature from the Civil War reconstruction period to the present with emphasis on the contemporary novel and theatre. *Preq:* SPAN 303, 304, or 311.

409 Advanced Grammar and Composition 3(3,0) An intensive study of syntax and stylistics through composition and translations. Practice in spoken Spanish. *Preq:* Senior standing or consent of department head.

422 The Contemporary Spanish-American Novel 3(3,0) New trends in the development of the Spanish-American novel from the 1940's to the present. *Preq:* SPAN 303, 304, or 311.

435 Contemporary Hispanic Culture 3(3,0) A study of social, political, economic, and artistic manifestations of contemporary Hispanic culture. *Preq:* SPAN 307, 308, or consent of department head.

440 Practical Communication Skills 3(3,0) A study of those communication skills (correspondence, composition, legal, medical, technical, and business terms) essential to effective communications with native Spanish speakers in these areas. *Preq:* SPAN 305, 306, or consent of department head.

498 Independent Study 1-3(1-3,0-3) Directed study of selected topics in Spanish language, literature, and culture. *Preq:* Consent of department head.

499 Spanish Literature, Language, and Culture 3(3,0) Selected topics and themes that have characterized Spanish literature, language, and culture throughout the centuries. May be repeated for a maximum of six credits. *Preq:* SPAN 303, 304, 311, or consent of department head.

SYSTEMS ENGINEERING (SE)

703 Engineering Project Operations 3(3,0)

803 Engineering Optimization and Applications 3(3,0)

807 Discrete Systems Simulation 3(3,0)

808 Continuous Systems Simulation 3(3,0)

860 Dynamic Programming 3(3,0)

861 Nonlinear Programming and Methods of Search 3(3,0)

880 Advanced Methods of Operations Research 3(3,0)

884 Advanced Engineering Economic Analysis 3(3,0)

885 Design and Analysis of Simulation Models 3(3,0)

886 Operations Research in Production Control 3(3,0)

888 Applied Queuing Theory and Markov Processes 3(3,0)

890 Special Problems in Systems Engineering 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

893 Special Topics in Systems Engineering 1-3(1-3,0)

895 Systems Engineering Seminar 1(1,0)

991 Doctoral Research. Credit to be arranged.

TEXTILE CHEMISTRY (TC)

Professors: R. H. Barker, H. M. Behery, T. D. Efland, J. C. Hubbard, Jr., J. H. Marvin, Jr., J. J. Porter, B. L. Rutledge II, E. A. Vaughn, *Director; Associate Professors:* M. J. Drews, J. D. Hatcher, C. W. Jarvis; *Assistant Professors:* O. F. Hunter, Sr., C. D. Rogers

303 Textile Chemistry 3(3,0) A study of the properties and reactions of aliphatic and aromatic organic compounds. Emphasis will be placed on mechanistic interpretations and the development of sythetic schemes leading to polyfunctional compounds of the types encountered in the textile industry. *Preq:* CH 102. *Coreq:* MTHSC 206.

304 Textile Chemistry 3(3,0) Fundamental principles of physical and organic chemistry with emphasis on areas frequently encountered in the textile industry including thermodynamics, kinetics, and solution properties. These concepts will be applied to the study of aliphatic organic compounds and organic reaction mechanisms. The basic principles of stereochemistry and conformational analysis will be developed. *Preq:* TC 303.

305 Textile Chemistry Laboratory 1(0,3) An introduction to the techniques used in the synthesis and characterization of organic compounds. *Coreq:* TC 303.

306 Textile Chemistry Laboratory 1(0,3) The techniques used in the sythesis or organic compounds and the measurement of their physio-chemical properties. *Coreq:* TC 304.

315, 615 Introduction to Polymer Science and Engineering 3(3,0) The chemistry of monomers and polymers and the chemical and physical properties of polymers are discussed emphasizing fiber forming, synthetic polymers. Kinetics of polymerization, molecular characterization, structure, morphology, and mechanical properties of polymers are studied demonstrating design of polymer systems for end use in textiles. *Preq:* CH 201 and 330 or 224, TC 304, or consent of instructor.

316, 616 Chemical Preparation of Textiles 3(2,3) The chemicals used in the preparation of fabric for dyeing and finishing. Oxidizing and reducing agents and their control and effect on various fibers. Collodial and surface active properties of various compounds and the fundamental factors influencing these properties.

317 Polymer and Fiber Laboratory 1(0,3) High polymers, prepared from monomers, are characterized and spun to make fibers. Chemical and physical properties of fiber forming polymers are measured as functions of parameters critical to properties of textiles. *Coreq:* TC 315.

405 Principles of Textile Printing 3(2,3) The development of modern textile printing systems will be studied. In addition, the colloidal requirements of colorants, thickener compositions, rheology of printing pastes, and the various physical requirements necessary for a successful printing system in a modern mill will be examined. *Preq:* TEXT 314 or consent of instructor.

406 Textile Finishing—Theory and Practice 3(2,3) Study of the application of chemicals to textile substrates and how they affect the substrate's physical and chemical properties. The course emphasizes the theories of chemical modification of textiles as well as the technology of finishing.

457, 657 Dyeing and Finishing I 3(3,0) A study of the different classes of dyestuffs and the chemistry of their applications to different fibers. The theories, principles and mechanisms for the dyeing of textile fibers and fabrics will be presented as well as the reaction mechanisms of various finishing agents applied to different substrates. *Preq:* TC 315.

458, 658 Dyeing and Finishing II 3(3,0) The kinetics and equilibria of dyeing processes. The use of conductivity, diffusion and other methods useful for measuring absorption of isotherms and dyeing rates and the general thermodynamic relationships applicable to dyeing operations. Fiber properties such as zeta potential, dye sites, relative amorphous area available will be included.

459, 659 Dyeing and Finishing Laboratory I 1(0,3) The course will introduce the student to common dyeing and printing methods and to some of the machinery necessary to carry out dyeing operations. *Coreq:* TC 457.

460 Dyeing and Finishing Laboratory II 1(0,3) The course will cover finishing in addition to dyeing operations and their instrumental control. *Coreq:* TC 458.

475, 675 Cellulose Chemistry 2(2,0) The organic chemistry of cellulose and its derivatives is developed from the basic principles of carbohydrate chemistry. Emphasis is placed on the substitution and degradation reactions which are particular of importance in textile applications. Fiber morphology is treated in relation to its effect on textile chemical processing. *Preq:* TC 315 or consent of instructor.

811 Polymer Science I 3(3,0)

812 Polymer Science II 3(3,0)

821 Chemistry of Natural Polymers 3(3,0)

831 The Physical Chemistry of Dyeing 3(3,0)

891 Master's Research. Credit to be arranged.

TEXTILE SCIENCE AND TEXTILE TECHNOLOGY (TEXT)

Professors: R. H. Barker, H. M. Behery, T. D. Efland, J. C. Hubbard, Jr., J. H. Marvin, Jr., J. J. Porter, B. L. Rutledge II, E. A. Vaughn, *Director; Associate Professors:* M. J. Drews, J. D. Hatcher, C. W. Jarvis; *Assistant Professors:* O. F. Hunter, Sr., C. D. Rogers

122 Introduction to Textiles 2(1,3) An introduction to the broad fields of textile, fiber and polymer science and engineering with emphasis on the description and formation of polymers, fibers,

yarns, and fabrics including nonwoven structures and the dyeing, finishing, and chemistry and physics of textiles, fibers and polymers.

175 Introduction to Textile Manufacturing 3(3,0) Introduction to the broad fields of textiles, fibers, and polymer science and engineering with emphasis on the description and formation of polymers, fibers, yarns, and fabrics including nonwoven structures; dyeing, finishing, chemistry, and physics of textiles, fibers, and polymers; testing and marketing of products.

176 Natural and Man-made Fibers 4(3,3) The concept of natural and synthetic polymers as the raw materials of the textile industry is introduced. A survey of the origin, characteristics, and processing properties of various natural fibers and fiber-forming synthetic polymers. Formation of textile fibers from polymeric materials will be presented with specific emphasis on the polymer science and engineering principles.

201 Yarn Structures and Formation 4(3,3) A study of the fiber processing systems required to transform various fibrous materials into yarn. The course involves the machine principles and theories, relationship of the fibers to the process and the resultant yarn structures, and subsequent analysis of the yarn structure to define quality and to determine suitable manufacturing practices. *Preq:* TEXT 175 and 176 or consent of instructor.

202 Fabric Structures, Design, and Analysis 4(3,3) A study of fabric formation techniques designed to explore the principles and theories of modern technology. Evaluation and analysis of knitting, weaving, and nonwoven fabrication of textile structures. *Preq:* TEXT 201 or consent of instructor.

301 Fiber Processing I 3(2,2) A study of fibrous materials and their relationship to the fiber processing systems. The objectives, theories, principles, and mechanisms of the machines used in the earlier stages of fiber processing. The course is directed primarily to the staple fiber processing systems. Mechanical and mathematical fundamentals are applied to the machines concerned.

302 Fiber Processing II 3(2,2) Continuation of TEXT 301 emphasizing the later stages of fiber processing for the ultimate yarn strand. *Preq:* TEXT 301.

305 Basic Fibers 3(3,0) A thorough survey of the origin, characteristics and properties of various textile fibers, both natural and man-made. The classification, identification, and principal fields of applications will be studied.

306 Yarn Formation 3(3,0) A fundamental study of the various systems of yarn formation from natural and man-made fibers and their blends. The course provides for the basic understanding of machines, theories and operations. Limited to Textile Chemistry and non-Textile majors.

308 Apparel 4(3,3) Introduction to apparel construction techniques and analysis of problems commonly encountered in the apparel industry. Evaluation of fabric design and properties. *Preq:* TEXT 202 or consent of instructor.

311 Fabric Development I 3(2,2) A study of the basic theory of the cam loom weaving machine. The principles of designs of the basic plain, twill, and sateen fabric, and other weaves such as the honeycomb, the mock leno, and the huckaback weave. Weave analysis and preparation of necessary drafts are included.

312 Fabric Development II 3(2,2) A study of the theory and operation of the dobby head, Knowles head, Staubli dobby, Jacquard head, and multicolor selection for the above looms. Weave design for compound fabrics using two or more systems of warp and filling threads for three-dimensional weaves, weave analysis, and preparation drafts are covered. *Preq:* TEXT 311.

313 Fabric Formation 3(3,0) Examination of the theories involved in the assembly of fibers and yarns into fabrics. The application of design, analysis and production of woven, knitted and nonwoven fabrics. A brief survey of the fabric producing machines. Limited to Textile Chemistry and non-Textile majors.

314 Dyeing and Finishing 3(3,0) Concepts of current procedures and future trends in the textile finishing industry are examined. The preparation of fabrics, dye processes and the application of various materials used in the finishing process are presented. Limited to Textile Technology and non-Textile majors.

321, 621 Fiber Science 3(2,2) Fiber properties and the scientific evaluation of these properties. Dimensional, mechanical, optical, electrical, thermal, and moisure relationships are established and investigated.

322, 622 Properties of Textile Structures 3(2,2) Yarn and fabric properties, their scientific significance and analysis. Dimensional, structural, and mechanical interrelationships are established and evaluated.

324 Textile Statistics 3(3,0) Introduction to statistics with particular application to the textile industry. Measures of central value and variation, probability, the normal curve, tests of hypotheses, elementary correlation and regression. *Preq:* Junior Standing.

333 The Textile Arts 3(2,3) Survey of the development of the hand loom from prehistoric times to the present. Studio work in the elements of handwoven fabrics, their design, analysis and production of four-harness counterbalance and jack looms. *Preq:* Junior standing or consent of instructor.

403, 603 Fiber Processing III 3(2,2) Concepts of current fiber processing machines, techniques, practices, and their validity are investigated. Problems are assigned that require use of acquired knowledge, textile testing equipment, and processing machines. The relation of fibrous material properties and processing dynamics to the fiber assemblies produced is studied. *Preq:* TEXT 301, 302.

411, 611 Fabric Development III 3(2,2) Study of specifications and loom details for the production of fabrics woven to the customer's order to include multicolor layouts. Warp and filling preparation are covered as well as size formulations and their methods of application. Warping and dressing plans are developed for the warper and the slasher. *Preq:* TEXT 312.

414 Nonwoven and Knitted Structures 3(3,0) Survey of nonwoven and knitted structures dealing with the principles and mechanisms involved. Various systems are covered with emphasis on fiber yarn requirements and fabric properties.

426, 626 Instrumentation 3(3,0) The principles of industrial and process instrumentation and process control. Static and dynamic characteristics of measurement devices. Transducer techniques for measurement of physical properties such as pressure, temperature, flow, weight, etc. Principles of process controllers.

428 Textile Research 1-3 Investigation of a problem in textile, fiber, or polymer science under the direct supervision of a faculty member. After completing the research, the student prepares a formal written report which is presented orally. *Preq:* Senior standing or consent of instructor.

429 Textile Research 1-3 Same as TEXT 428.

440, 640 Color Science 3(2,3) Application of the science of color to industrial practice in textiles, plastics, paints, lighting, and ceramics. Laboratory work will be performed on modern instruments and computers.

450 Textiles in Sports and Recreation 3(3,0) This course provides a basic understanding of the various types of fabrics used in athletic and recreational activities. Methods and procedures for the evaluation of fabric performance and properties as well as criteria for the selection and care of textile materials used in sports and recreational activities are provided.

460, 660 Textile Processes 3(3,0) Survey of machinery and processes of textile manufacturing from fiber formation through fabric finishing. For students with a nontextile background.

470 Textile Costing and Inventory Control 3(3,0) Study of the principles of costing as they specifically apply to the manufacture of textiles. Allocation of cost of material, labor, and overhead: determining the unit cost of yarns, fabrics, and finishes. Inventory systems, storage, materials handling and profiles. *Preq:* TEXT 202 or consent of instructor.

471 Plant Layout and Processing Design 3(3,0) Survey of the essentials necessary for textile process implementation from the pilot plant concept to a functioning textile process facility. Consideration will be given to material flow requirements, power requirements, machinery layout, environmental controls, and facility design. *Preq:* TEXT 202.

475 Textile Marketing 3(3,0) An examination of the activities involved in the distribution of textile products in today's market. Emphasis will be placed on the role of consumer research and the analysis of fashion in the design and promotion of textile products.

701 Applied Science Technologies 3(2,4)

821 Fiber Physics 3(3,0)

830 Textile Physics 3(3,0)

835 Textile Structures 3(3,0)

840 Advanced Color Science 3(2,3)

866 Fiber Formation 3(3,0)

870 Advances in Textile Manufacturing 3(3,0)

880 Selected Topics 3(3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

VOCATIONAL AND TECHNICAL EDUCATION (VTED)

710 Foundations of Vocational and Technical Education 3(3,0)

733 Curriculum Construction in Vocational and Technical Education 3(3,0)

735 Application of Instructional Technology 3(3,0)

760 Programs, Concepts, and Issues in Vocational and Technical Education 3(3,0)

761 Administration and Supervision in Vocational and Technical Education 3(3,0)

763 Inservice and Continuing Education 3(3,0)

812 Vocational and Technical Program Finance 3(3,0)

876 College Teaching 3(3,0)

882 Seminar 1(1,0)

893 Advanced Research Design and Analysis 3(3,0)

991 Doctoral Research. Credit to be arranged.

WILDLIFE AND FISHERIES BIOLOGY (WFB)

Professor: S. B. Hays, *Head; Associate Professors:* A. G. Eversole, T. T. Fendley, J. R. Sweeney; *Assistant Professor:* J. W. Foltz; *Visiting Professor:* L. G. Webb

306 Wildlife Resources of the Southeastern United States 2(2,0)F, S A study of the wildlife resources of the Southeastern states, including population trends, life histories and economic importance. Conservation and proper utilization by man are emphasized. Not open to students who have had WFB 412 or ZOOL 411.

350 Principles of Fish and Wildlife Biology 3(3,0) Introduction to principles of fisheries and wildlife biology on which sound management practices are based. Interrelationships of vertebrate and invertebrate biology, habitat, and population dynamics will be covered. *Preq:* One year of general biology.

412, H412, 612 Wildlife Management 3(2,3) Basic principles and general practices of wildlife management and conservation will be covered. Major problems concerning the management of wildlife resources, with emphasis on upland game species. Laboratory work includes practical work on the Clemson University woodlands and field trips to several areas where wildlife management is being practiced.

416, 616 Fishery Biology 3(2,3) Principles underlying freshwater fish production. Introduction to major groups of freshwater fishes and their habitats. Topics include identification, age and growth, fecundity, food habits, populations estimation, environmental evaluation, management practices, and fish culture. *Preq:* One year of introductory biology and Junior standing.

460, 660 Biology and Management of Marine Fish and Shellfish 3(3,0) A survey of economically important marine shellfish, finfish and mammals, emphasizing those taxa found in the western Atlantic Ocean; topics will include classification of marine habitats, life history characteristics, management techniques, fishing methods, and prospectus of future fishing. *Preq:* One year of general biology.

462, H462, 662 Aquatic Productivity 3(3,0) Study of selected topics in oceanography and limnology with special reference to fundamental work on organic productivity. Class consists of lectures and discussions of ecological principles of biochemical cycles, energy transfer, trophic levels, and productivity of aquatic systems. Includes consideration of related topics in the development and utilization of marine resources. *Preq:* ZOOL 201, 202, or consent of instructor.

463 Directed Research in Fisheries and Wildlife Biology 1-3(0,3-9) Research problems in selected areas of wildlife and fisheries sciences to introduce the student to experimental design, research techniques, and presentation of research results. May be repeated for a maximum of three credit hours. *Preq:* Consent of instructor.

468, 668 (ENT) Introduction to Research 2(1,3) See ENT 468.

469, H469, 669 (ENT) Aquatic Insects 3(1,6) See ENT 469.

490 Practicum 1-4 Supervised wildlife biology learning opportunity, providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written report midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. *Preq:* Junior standing and consent of instructor.

499 Wildlife Biology and Fisheries Seminar 1(1,0) An exploration of current literature and research in fisheries and wildlife sciences. Students will participate in the analysis of research findings, utilizing skills acquired in their undergraduate programs. May be repeated once for credit.

809 Seminar in Wildlife and Fisheries Science 1(1,0)

815 Principles of Wildlife Biology 3(2,3)

816 Applied Wildlife Biology 3(2,3)

818 Ecology and Management of Wetland Wildlife 3(2,3)

819 Special Topics in Wildlife Management 1-4(1-4,0)

840 Impoundment and Stream Management 3(2,3)

850 Aquaculture 3(3,0)

861 Special Topics in Fishery Biology 1-4(1-4,0)

863 Special Problems in Wildlife and Fisheries Biology 1-3(0,3-9)

891 Master's Research. Credit to be arranged.

ZOOLOGY (ZOOL)

Professors: S. A. Gauthreaux, Jr., R. L. Hays, C. W. Helms, *Head;* J. E. Schindler, J. B. Wourms; *Associate Professors:* R. R. Montanucci, G. P. Noblet, E. B. Pivorun, E. E. Ruppert, R. J. Taylor, A. P. Wheeler, D. G. Yardley; *Assistant Professors:* J. M. Colacino, D. G. Heckel; *Instructor:* J. B. Waide; *Adjunct Professors:* M. A. Buzas, J. J. Paulin; *Adjunct Associate Professor:* J. J. Alberts; *Adjunct Assistant Professor:* P. A. Gowaty

100 The Biology of Human Survival 1(1,0) A biological overview of aspects of contemporary life of interest to the individual and to the social welfare of man now and in the future.

201 Invertebrate Zoology 4(3,3) A survey of the phyla of invertebrate animals, including their taxonomy, morphology, development, and evolution. *Preq:* BIOL 111 or consent of instructor.

202 Vertebrate Zoology 4(3,3) An introductory study of vertebrates, emphasizing selected aspects of gross, microscopic, and developmental structure and basic function from a phylogenetic point of view. *Preq:* BIOL 111 or consent of instructor.

222 Human Anatomy 4(3,3) A basic and systematic study of human anatomy. *Preq:* BIOL 104 or 111 or equivalent.

223 Human Physiology 4(3,3) A basic and systematic study of human physiology. *Preq:* BIOCH 210 and ZOOL 222 or consent of instructor.

301, H301 Comparative Vertebrate Anatomy 4(3,3) A comparative study of the gross morphology of vertebrates. Recommended only for Zoology majors. *Preq:* ZOOL 202.

340, H340 Cell Biology 3(3,0) Introduction to structure, function, and diversity of cells, and cell biological technique, emphasizing biomembranes, cell cycle, energy transduction, motility, secretion and cellular digestion, with a focus on animal cells. *Preq:* BIOCH 301 or consent of instructor.

341, H341 Cell Biology Laboratory 1(0,3) Laboratory exercises will reinforce the principles presented in ZOOL 340 and introduce several modern techniques currently used in cell biological research including centrifugation, cytotechnique, electophoresis, measurement of membrane potentials and radioisotope technique. *Coreq:* ZOOL 340.

350, H350 Developmental Biology 4(3,3) Events and mechanisms responsible for the development of multicellular animals. Gametogenesis, fertilization, embryonic development, cellular differentiation, morphogenesis, larval forms and metamorphosis, asexual reproduction, regeneration, malignancy, and aging will be analyzed in terms of fundamental concepts and control processes. *Preq:* BIOCH 301 or consent of instructor.

403, H403, 603 Protozoology 3(2,3) A survey of the protozoa with emphasis on organization and function. Representative types of both free-living and parasitic forms will be examined for each major taxon. *Preq:* BIOL 104, 106, or 111.

405, H405, 605 Animal Histology 4(3,3) A structural and functional study of the basic tissues of animals and the tissue makeup of organs. Mammalian histology is stressed but comparative histology will be incorporated. The course is directed toward study at the light microscope level. Detailed study of selected cells will utilize electron micrographs. *Preq:* ZOOL 202 or consent of instructor.

410, H410, 610 Limnology 4(3,3) A detailed introduction to the physical, chemical, and biological interrelationships that characterize inland water environments. A fundamental approach to the interactions of components of the environment is developed at the theoretical level. Field and laboratory instruction in techniques of analysis are utilized to illustrate applications of theoretical concepts. *Preq:* ZOOL 201, 411, General Chemistry.

411, H411, 611 Animal Ecology 4(3,3) A fundamental approach to basic ecological principles underlying the interrelationships of organisms with their biotic and abiotic environments. A variety of aquatic and terrestial ecosystems will be studied both in the field and in the laboratory. *Preq:* MTHSC 106, ZOOL 201 and 202, or consent of instructor.

412, H412, 612 Aquatic Ecology 4(3,3) A study of ecological principles in aquatic systems, emphasizing functional relationships and productivity of biotic communities as they are influenced by the dynamics of physical, chemical, and biotic environmental parameters. *Preq:* ZOOL 410 or consent of instructor.

415, 615 Introduction to Mathematical Ecology 3(3,0) This course will focus on current and broadly applicable mathematical models in ecology emphasizing ecological assumptions underlying mathematical approaches, theories, and limitations of specific models, and the ecological insights provided. *Preq:* MTHSC 108 and ZOOL 411 or consent of instructor.

420, 620 Principles of Evolution 4(4,0) Introduction to the fundamental principles and major concepts of the evolutionary process in animals, including a consideration of evolutionary theories, adaptive processes in populations, and major evolutionary patterns and to the principles of classification and systematics. *Preq:* GEN 302 or 305, or consent of instructor.

421, 621 Advanced Invertebrate Zoology 4(3,3) A survey of the interstitial fauna of marine sands will be made with reference to habitat characteristics, ecology, physiology, morphology, and systematics. The taxa presented will include cnidariaactinulida, gastrotricha, gnathostomulida, turbellaria, nematoda, tardigrada, kinorhyncha, archiannelida, various arthropod taxa, and other groups. Field trips included. *Preq:* ZOOL 201 or consent of instructor.

430, 630 Introduction to Population Genetics 3(3,0) Study of the genetic structure of population and its importance in evolution as shown by field, experimental, and theoretical studies. Topic include natural selection, migration, genetic drift, mutation, meiotic drive, linkage, mating sy tems, IQ and heritability, evolution of pesticide resistance, human population genetics, eugenic and genetic counseling. *Preq:* BIOL 111, GEN 302 or 305.

450, H450, 650 Comparative Vertebrate Embryology 4(3,3) A comparative study of the developin vertebrate body from fertilization through organogenesis. Patterns of reproduction and embryoni development, morphogenesis, organogenesis, and the functional differentiation of cells an tissues will be considered. *Preq:* ZOOL 350 or consent of instructor.

456, 656 Parasitology 4(3,3) Introduction to symbiosis and parasitism in the animal kingdom wit emphasis on both basic and applied principles. Classical and experimental approaches to th study of parasitism are examined in reference to protozoa, helminths, and arthropods. *Preq:* ZOO 201 or consent of instructor.

457, H457, 657 Comparative Physiology 4(3,3) A comparative study of physiological processe throughout the animal kingdom. Laboratories will introduce the use of basic instrumentation an will provide an opportunity to perform original experiments. *Preq:* BIOCH 301 or consent c instructor.

458, H458, 658 Cell Physiology 4(3,3) Chemical and physical principles of function, largely at th cellular level. Laboratories will demonstrate the principles discussed and will provide an introduc tion to methodology. *Preq:* ZOOL 340 or consent of instructor.

459, H459, 659 Systems Physiology 4(3,3) Physiological systems (neural, muscular, skeleta endocrine, circulatory, respiratory, digestive, and excretory) of vertebrates and their homeostati controls. *Preq:* ZOOL 202 or consent of instructor.

462, 662 Herpetology 3(2,3) Systematics, life history, distribution, ecology, and current literature c amphibians and reptiles. Laboratory study of morphology and identification of world families, an U.S. genera, as well as all southeastern species. Field trips will be required. *Preq:* ZOOL 202 or cor sent of instructor.

463, 663 Ichthyology 3(2,3) Systematics, life history, distribution, ecology, and current literature o fish. Laboratory study of morphology and identification of U.S. genera, as well as all southeaster species. Field trips will be required. *Preq:* ZOOL 202 or consent of instructor.

464, 664 Mammalogy 3(2,3) Origin, evolution, distribution, structure, and function of mammals with laboratory emphasis on the mammals of South Carolina. Field collection required. *Preq* ZOOL 202 or consent of instructor.

465, 665 Ornithology 4(3,3) The biology of birds: their origin and diversification, adaptations phylogeny, classification, structure and function, behavior, ecology, and biogeography. Field ider tification is emphasized and field trips are required. *Preq:* ZOOL 202 or consent of instructor.

470, 670 Animal Behavior 3(3,0) Historical and modern developments in animal behavior empha sizing the evolutionary and ecological determinants of behavior. A synthesis of ethology and com parative psychology. *Preq:* ZOOL 202 or consent of instructor.

471, 671 Animal Behavior Laboratory 1(0,3) Laboratory exercises that explore the behavior o animals. Emphasis is on behavioral observation and analysis and presentation of findings in report format. *Preq:* ZOOL 202, 470, or consent of instructor.

475, 675 Vertebrate Endocrinology 3(3,0) Introduction to the basic principles of neuroendocrin integration and homeostatic maintenance in vertebrates. Comparative morphology and physiol ogy of various endocrine tissues and hormone chemistry and modes of action are considered *Preq:* ZOOL 202, organic chemistry, or consent of instructor.

476, 676 Experimental Vertebrate Endocrinology Laboratory 2(0,6) Laboratory to demonstrate prin ciples discussed in ZOOL 475. Experiments conducted by individuals will be drawn from classica papers which demonstrate specific endocrine functions; original experiments will examine hor

monal effects on selected physiological parameters, and assays and determinations of unknown hormones will be made. *Preq:* ZOOL 475 or consent of instructor.

480, 680 Analysis of Development 3(3,0) Concepts, problems, and experimental observations central to the study of cellular differentiation and development, particularly in animals. Emphasis is on the critical reading of research literature on the control of genetic expression and nucleocytoplasmic, cell-cell, and cell-environmental interactions. *Preq:* ZOOL 350 or consent of instructor.

491 Special Problems in Zoology 2-4 Library and laboratory experience in experimental design and research in selected biological discipline. Results will be presented in an open seminar and in a research paper to be evaluated by at least two faculty members. May be taken for credit no more than twice for a maximum of 8 credits. *Preq:* Junior or Senior standing and consent of instructor.

493 Undergraduate Seminar 1(1,0) Exploration of current zoological literature. *Preq:* Senior standing.

701 Man's Impact on Ecology 3(3,0)

803 Population Dynamics 4(2,6)

810 Behavioral Ecology 3(3,0)

812 Seminar 1(1,0)

815 Physiological Ecology 4(3,3)

816 Advanced Ecosystem Analysis I 4(3,3)

817 Advanced Ecosystem Analysis II 4(3,3)

818 Community Ecology 4(3,3)

835 Interpretative Electron Microscopy 3(3,0)

852 Principles and Methods of Systematic Zoology 2(2,0)

861 Special Topics 1-4(1-4,0)

863 Special Problems 1-4

865 Advanced Ornithology 3(3,0)

881 Methods in Developmental Biology 2(0,6)

883 Special Topics in Evolutionary Biology 1-4(1-3,0-3)

884 Special Topics in Physiology 1-4(1-3,0-3)

885 Special Topics in Ecology 1-4(1-3,0-3)

886 Special Topics in Animal Behavior 1-4(1-3,0-3)

887 Special Topics in Cellular and Developmental Biology 1-4(1-3,0-3)

888 Special Topics in Organismal Biology 1-4(1-3,0-3)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

FACULTY

Abernathy, Atwell Ray, *Professor of Environmental Systems Engineering.* AB, Lenoir-Rhyne College, 1953; MSPH, 1959, PhD, 1963, University of North Carolina

Abramovitch, Dorota Aleksandra, *Research Associate/Assistant Professor of Biochemistry.* MS, Technical University of Wroclaw (Poland), 1973; PhD, Clemson University, 1980

Abramovitch, Rudolph Abraham, *Professor of Chemistry.* BS, Alexandria University, 1950; PhD, King's College (England), 1953; DSc, University of London, 1964

Acker, James David, *Assistant Professor of Accounting and Finance.* BS, University of South Carolina, 1958; MEd, Clemson University, 1965; EdD, North Carolina State University, 1971

Ackerman, Carl Willis, *Professor of Animal Science.* BS, 1953, MS, 1960, Clemson University

Acorn, John Thompson, *Head of History and Visual Studies Department; Professor of History and Visual Arts.* BA, Montclair State College, 1959; MFA, Cranbrook Academy of Art, 1961

Acton, James Crockett, *Professor of Food Science.* BS, 1965, PhD, 1970, University of Georgia

Adair, Joseph Henry, *Assistant Professor of Education.* AB, 1948, BD, 1951, Johnson C. Smith University; MEd, Furman University, 1967

Addison, Clarence Lee Benjamin, *Associate Professor of Building Science.* BArch, Howard University, 1959; MArch, Clemson University, 1974

Adkins, Theodore Roosevelt, Jr., *Professor of Entomology, Fisheries, and Wildlife.* BS, 1952, MS, 1954, PhD, 1958, Auburn University

Aitken, James Bruce, *Professor of Horticulture, Sandhill Experiment Station.* BS, 1962, MS, 1964, Clemson University; PhD, University of Florida, 1967

Alajajian, Charles John, *Assistant Professor of Electrical and Computer Engineering.* BS, Purdue University, 1974; MS, 1976, PhD, 1979, University of Illinois

Alam, Kursheed, *Professor of Mathematical Sciences.* BS, 1941, MS, 1943, Patna Science College; PhD, University of Minnesota, 1963

Albert, Harold Edward, *Professor of Political Science.* BS, Madison College, 1957; BD, United Theological Seminary, 1960; MAT, Miami University (Ohio), 1960; PhD, Florida State University, 1972

Alberts, James Joseph, *Adjunct Associate Professor of Zoology.* BA, Cornell College, 1965; MS, Dartmouth College, 1967; PhD, Florida State University, 1970

Albrecht, John Ernest, *Professor of Animal Science.* BS, Delaware Valley College, 1965; MS, 1968, PhD, 1971, North Carolina State University

Allen, Joe Frank, *Professor of Chemistry.* AB, Berry College, 1955; MS, University of Mississippi, 1959; PhD, Georgia Institute of Technology, 1963

Allen, Keith Roy, *Assistant Professor of Computer Science.* MA, 1967, PhD, 1970, University of Virginia; MS, Indiana University, 1979

Allen, Robert Max, *Professor of Forestry.* BS, 1947, MS, 1951, Iowa State University; PhD, Duke University, 1958

Allen, William Harold, *Associate Professor of Agricultural Engineering.* BS, 1966, MS, 1969, Clemson University; PhD, University of Tennessee, 1972

Alley, Forrest Christopher, *Professor of Chemical Engineering.* BS, 1951, MS, 1956, Auburn University; PhD, University of North Carolina, 1962; PE

Alphin, John Gilbert, *Professor of Agricultural Engineering, Pee Dee Experiment Station.* BS, 1960, MS, 1962, PhD, 1965, North Carolina State University

Alverson, David Roy, *Assistant Professor of Entomology, Fisheries, and Wildlife.* BS, 1968, MS, 1976, Clemson University; PhD, University of Georgia, 1979

Amacher, Ryan Custer, *Dean, College of Commerce and Industry; Professor of Economics.* BA, Ripon University, 1967; PhD, University of Virginia, 1971

Anand, Subhash Chandra, *Professor of Civil Engineering.* BS, Banaras Hindu University (India), 1955, MS, 1965, PhD, 1968, Northwestern University; PE

Anand, Vera Barata, *Assistant Professor of Engineering Graphics.* BS, University of Para (Brazil), 1961; MS, Northwestern University, 1966

Andersen, Robert Louis, *Head of Horticulture Department; Professor of Horticulture.* BS, Iowa State University, 1960; MS, 1964, PhD, 1971, Michigan State University

Anderson, Luther Perdee, *Dean, College of Agricultural Sciences; Professor of Agronomy and Soils.* BS, 1949, MS, 1962, Clemson University; PhD, University of Georgia, 1968

Aneja, Rajindra, *Professor of Food Science.* BS, 1954, MS, 1956, PhD, 1959, University of Delhi

Aneja, Sarla, *Instructor in Biology.* BS, 1958, MS, 1960, University of Delhi; Dip Microbiology, 1974, City of London Polytechnic Institute

Arbena, Joseph Luther, *Professor of History.* AB, George Washington University, 1961; PhD, University of Virginia, 1970

Armstrong, Frances Crosby, *Lecturer in Biology.* BS, Clemson University, 1978

Arnold, Edwin Pratte, *Assistant Professor of German.* BA, University of South Carolina, 1958; MA, Kent State University, 1968

Ashworth, Ralph Page, *Professor of Botany.* BS, Wake Forest University, 1939; MA, 1945, PhD, 1960, University of North Carolina

Askew, George Robert, Jr., *Assistant Professor of Forestry, Belle W. Baruch Forest Science Institute.* BS, 1976, MS, 1978, PhD, 1981, Clemson University

Atchley, Bill Lee, *President of the University; Professor of Civil Engineering.* BS, 1957, MS, 1959, University of Missouri; PhD, Texas A&M University, 1965; PE

Aucoin, Claire Russell, *Assistant Professor of Mathematical Sciences.* AB, Shorter College, 1951; MS, Auburn University, 1954

Aucoin, Clayton Verl, *Professor of Mathematical Sciences and Management; University Marshal.* BA, Louisiana College, 1951; MS, 1953, PhD, 1956, Auburn University; Post Doctorate, Stanford University, 1960-61

Axel, Claudia, *Visiting Instructor in English.* BFA, New York University, 1977; MA, City College of New York, 1981

Bailey, Roy Horton, Jr., *Associate Professor of Chemistry.* BS, 1948, PhD, 1958, University of North Carolina

Baillie, Earle Eugene, *Adjunct Professor of Medical Technology, Anderson Memorial Hospital.* BS, MD, University of Nebraska, 1967

Baines, Elizabeth Murrow, *Assistant Professor of Nursing.* BS, College of St. Mary, 1962; MSN, 1976, PhD, 1981, University of Nebraska

Baker, Donald Nelson, *Adjunct Professor of Agriculture.* BS, Pennsylvania State University, 1956; MS, 1959, PhD, 1962, Cornell University

Baker, Elisha Remington IV, *Associate Professor of Systems Engineering.* BS, 1970, MS, 1972, PhD, 1975, Clemson University

Ballard, Robert Edward, *Assistant Professor of Botany.* BS, 1966, MA, 1968, Miami University; PhD, University of Iowa, 1975

Barber, Mary Frances, *Assistant Professor of Nursing.* BSN, 1973, MSN, 1976, Hunter College

Barfield, Rayford Elliott, Jr., *Associate Professor of English.* AB, LaGrange College, 1961; MA, University of Georgia, 1963; PhD, University of Tennessee, 1969

Barham, Barbara Chicvara, *Assistant Professor of Nursing.* BSN, Barry College, 1970; MS, Rutgers University, 1977

Barker, Robert Henry, *J.E. Sirrine Professor of Textile Chemistry.* BS, Clemson University, 1959; PhD, University of North Carolina, 1963

Barlage, William Berdell, Jr., *Head of Chemical Engineering Department; Professor of Chemical Engineering.* BS, Lehigh University, 1954; MChE, University of Virginia, 1955; PhD, North Carolina State University, 1960

Barnett, Bobby Dale, *Head of Poultry Science Department; Professor of Poultry Science.* BS, 1950, MS, 1954, University of Arkansas; PhD, University of Wisconsin, 1957

Barnett, Ortus Webb, Jr., *Professor of Microbiology, Plant Pathology and Physiology.* BSA, 1961, MS, 1965, University of Arkansas; PhD, University of Wisconsin, 1968; Post Doctorate, Scottish Horticultural Institute, 1968-69

Barnett, William Jackson, *Adjunct Associate Professor of Engineering Technology.* BS, Clemson University, 1963; MS, Rutgers University, 1965; PhD, Clemson University, 1972

Baron, William, *Associate Professor of Civil Engineering.* BSCE, City College of New York, 1960; MSCE, 1963, PhD, 1966, Purdue University; PE

Barth, Clyde Lewis, *Professor of Agricultural Engineering.* BS, University of Illinois, 1955; MS, 1961, PhD, 1971, University of Wisconsin

Bate, James Alan, *Lecturer in Computer Science.* BS, Bob Jones University, 1971; MS, 1971, PhD, 1977, Clemson University

Batstone-Cunningham, Ron Leroy, *Visiting Instructor in Chemistry.* BS, University of Puget Sound, 1975; PhD, University of California, 1982

Bauer, Larry Lee, *Professor of Agricultural Economics and Rural Sociology.* BS, University of Illinois, 1961; MS, Purdue University, 1963; PhD, North Carolina State University, 1968

Bauld, Nelson Robert, Jr., *Professor of Mechanical Engineering and Engineering Mechanics.* BSME, 1958, MS, 1960, West Virginia University; PhD, University of Illinois, 1963; PE

Baumgardner, Reginald Andrew, *Associate Professor of Horticulture.* BS, Clemson University, 1957; MS, 1960, PhD, 1962, University of Maryland

Baxa, Ernest Granville, Jr., *Associate Professor of Electrical and Computer Engineering.* BEE, University of Virginia, 1962; MSEE, 1968, PhD, 1970, Duke University

Baxter, Ann Webster, *Associate Professor of Microbiology.* BA, Rockford College, 1938; MAT, 1964, PhD, 1967, University of North Carolina

Baxter, Luther Willis, *Professor of Plant Pathology and Physiology.* BS, Eastern Kentucky State College, 1950; MS, 1952, PhD, 1954, Louisiana State University

Bayliss, Frank Terrell, *Adjunct Professor of Microbiology.* BS, 1966, MA, 1967, Long Beach City College; PhD, University of California (Davis), 1971

Beard, John Nelson, Jr., *Professor of Chemical Engineering.* BS, University of South Carolina, 1958; MS, 1970, PhD, 1971, Lousiana State University

Beck, Evelyn Regina, *Instructor in English.* BA, 1979, MA, 1981, Florida State University

Becker, Robert Henry, *Director, Energy and Resource Development Institute; Associate Professor of Forest and Recreation Resources.* BS, Pennsylvania State University, 1970; MA, 1973, PhD, 1976, University of Maryland

Beckley, David Lynn, *Visiting Instructor in English.* BA, Capital University, 1976; MA, Florida State University, 1982

Beckwith, William Frederick, *Professor of Chemical Engineering.* BS, 1957, MS, 1961, PhD, 1963, Iowa State University; PE

Behery, Hassan Mohamad, *Professor of Textiles.* BS, 1950, MS, 1955, Alexandria University; PhD, Manchester College of Science and Technology, 1959

Belcher, Cynthia Leahy, *Assistant Professor of Nursing.* BSN, University of Miami, 1969; MN, Emory University, 1971

Bennett, Archie Wayne, *Head of Electrical and Computer Engineering Department; Professor of Electrical and Computer Engineering.* BS, 1960, MS, 1963, Virginia Polytechnic Institute and State University; PhD, University of Florida, 1966; PE

Bennett, Dennis Warren, *Assistant Professor of Chemistry.* BS, 1969, PhD, 1978, University of Utah

Bennett, John Everett, *Associate Professor of Electrical and Computer Engineering.* BSEE, 1958, MSEE, 1968, PhD, 1970, University of Tennessee

Berger, Leonard, *Associate Professor of Psychology.* AB, 1968, MA, 1969, PhD, 1972, Temple University

Berry, Elizabeth Brunson, *Associate District Extension Leader; Associate Professor of Home Economics.* BS, Winthrop College, 1944

Berry, Steven Spencer, *Visiting Instructor in Agricultural Engineering.* BAE, 1977, MS, 1980, North Carolina State University

Beyerlein, Adolph Louis, *Professor of Chemistry.* BS, Fort Hays Kansas State College, 1960; PhD, University of Kansas, 1966

Bilge, Fertac Huseyin, *Assistant Professor of Bioengineering.* BS, Bogazici University (Turkey), 1973; MS, Texas A&M University, 1978; PhD, University of Texas Health Science Center at Dallas, 1982

Birkhead, Paul Kenneth, *Professor of Geology.* AB, 1951, AM, 1960, University of Missouri; PhD, University of North Carolina, 1965

Birrenkott, Glenn Peter, Jr., *Assistant Professor of Poultry Science.* BS, 1973, MS, 1975, PhD, 1978, University of Wisconsin

Bishop, Carl Barnes, *Associate Professor of Chemistry.* BS, Clemson University, 1954; PhD, Michigan State University, 1959

Bishop, Eugene Harlan, *Acting Associate Dean, College of Engineering; Professor of Mechanical Engineering.* BS, Mississippi State University, 1955; PhD, University of Texas, 1964

Bishop, Muriel Boyd, *Professor of Chemistry; Coordinator of Medical Technology Program.* BA, Huntingdon College, 1952; MS, Emory University, 1955; PhD, Michigan State University, 1958; Post Doctorate, Yale University, 1958-59

Black, Donald Burdette, *Adjunct Associate Professor of Chemistry.* BS, University of Illinois, 1933

Black, John Olar, Jr., *Head of Seed Certification; Lecturer in Agronomy and Soils.* BS, 1957, MS, 1961, Clemson University

Blair, Dudley Wayne, *Associate Professor of Economics.* BS, 1970, PhD, 1975, Texas A&M University

Blanton, Lloyd Houston, *Associate Professor of Agricultural Education.* BS, 1961, MAgEd, 1968, Clemson University; PhD, Ohio State University, 1970

Bodine, Ashby Burgess II, *Assistant Professor of Dairy Science.* BA, 1969, MS, 1975, PhD, 1978, Clemson University

Boettner, George Robert, *Visiting Assistant Professor of Recreation and Park Administration.* BS, 1965, MEd, 1966, East Carolina University

Boineau, John Pope, *Adjunct Professor of Bioengineering.* BS, University of South Carolina, 1955; MD, Duke University School of Medicine, 1959

Book, Norman Loyd, *Professor of Building Science.* BAE, 1955, MEngr, 1967, PhD, 1973, Pennsylvania State University; AIA, PE

Bookmyer, Beverly Brandon, *Professor of Physics and Astronomy.* AB, Chestnut Hill College, 1946; MS, 1961, PhD, 1964, University of Pennsylvania

Boone, Merritt Anderson, *Visiting Professor of Poultry Science.* BS, University of Nebraska, 1941; MS, Michigan State University, 1947; PhD, University of Georgia, 1962

Borgman, Robert Frederic, *Professor of Food Science.* DVM, 1947, MS, 1949, Michigan State University; PhD, Kansas State University, 1959

Bose, Anil Kumar, *Associate Professor of Mathematical Sciences.* BS, 1948, MS, 1956, Calcutta University; PhD, University of North Carolina, 1964

Bose, Ranavir, *Assistant Professor of Mathematical Sciences.* MS, Case Western Reserve University, 1977; PhD, University of Texas, 1982

Bowles, David Christopher, *Assistant Professor of Economics.* BA, Johns Hopkins University, 1975; MA, 1977, PhD, 1980, Duke University

Bowman, Larry Stanley, *Adjunct Professor of Bioengineering.* BA, West Virginia University, 1969; MS, Clemson University, 1971; MD, Medical University of South Carolina, 1974

Box, Benton Holcomb, *Dean, College of Forest and Recreation Resources; Professor of Forestry.* BS, 1957, MF, 1959, Louisiana State University; DF, Duke University, 1967

Boyett, Arthur Simeon II, *Associate Professor of Accounting and Finance.* BS, 1966, MA, 1970, University of Georgia; DBA, Texas Tech University, 1980; CPA

Bradbury, Douglas Wilson, *Alumni Professor of Mechanical Engineering.* BME, Clemson University, 1940; MSE, University of Michigan, 1959; PE

Bradshaw, David Winstead, *Assistant Professor of Horticulture.* BS, 1968, MS, 1973, North Carolina State University; PhD, Virginia Polytechnic Institute and State University, 1977

Bragg, Charles Kenneth, *Adjunct Professor of Textiles.* BS, Wofford College, 1961; MS, Institute of Textile Technology (Virginia), 1963

Brainerd, Edwin Grenier, Jr., *Assistant Professor of Psychology.* BA, Washington College, 1968; MA, 1971, PhD, 1974, West Virginia University

Brannan, James Richard, *Assistant Professor of Mathematical Sciences.* BS, 1973, MS, 1976, Utah State University; PhD, Rensselaer Polytechnic Institute, 1979

Brannock, Durant York, Jr., *Assistant Professor of French.* AB, Elon College, 1954; MA, Duke University, 1956

Brantley, Herbert, *Associate Dean, College of Forest and Recreation Resources; Head of Recreation and Park Administration Department; Professor of Recreation and Park Administration.* AB, 1956, MA, 1958, PhD, 1966, University of North Carolina

Brawley, Joel Vincent, Jr., *Alumni Professor of Mathematical Sciences.* BS, 1960, MS, 1962, PhD, 1964; North Carolina State University

Bridgwood, Michael Andrews, *Assistant Professor of Electrical and Computer Engineering.* BSC, Leeds University (England), 1968; MSC 1975, PhD, 1979, Portsmouth Polytechnic (England)

Brisbin, I Lehr, Jr., *Adjunct Associate Professor of Entomology, Fisheries, and Wildlife.* BA, Wesleyan University, 1962; MS, 1965, PhD, 1967, University of Georgia

Briscoe, Ida Carolyn, *Professor of Education.* BA, LaGrange College, 1957; MEd, 1961, SEd, 1967, EdD, 1970, University of Georgia

Brittain, Jere Alonzo, *Professor of Horticulture, Sandhill Experiment Station.* BS, Clemson University, 1961; PhD, Virginia Polytechnic Institute and State University, 1967

Bronk, Burt Victor, *Professor of Physics and Microbiology.* BS, Pennsylvania State University, 1956; PhD, Princeton University, 1965

Brooks, Afton DeWayne, *Director of Educational Services; Associate Professor of Education.* BA, Carson-Newman College, 1963; MEd, Middle Tennessee State University, 1967; EdD, University of Georgia, 1972

Brown, Carolyn Scurry, *Assistant Professor of Biochemistry.* BA, Winthrop College, 1964; PhD, Vanderbilt University, 1969

Brown, Farrell Blenn, *Associate Dean, Graduate School; Professor of Chemistry.* BS, Lenoir-Rhyne College, 1957; MS, 1960, PhD, 1962, University of Tennessee; Post Doctorate, Texas A&M University, 1962-63

Brown, Lamar Hamilton, *Professor of Building Science.* BArch, Auburn University, 1948

Brown, Richard Bertram, *Assistant Chemist, Agricultural Chemical Services; Lecturer in Food Science.* BS, St. Francis College, 1968; MS, Old Dominion University, 1975; PhD, Clemson University, 1980

Brown, Russell Henry, *Professor of Civil Engineering and Engineering Mechanics.* BS, University of Houston, 1966; PhD, Rice University, 1970; PE

Brown, Susan Henrietta, *Associate Professor of Marketing.* BA, 1947, JD, 1950, University of Georgia; LLM, University of Pennsylvania, 1972

Brown, Susan Stuart, *Assistant Professor of Sociology.* BA, University of Richmond, 1973; MA, 1975, PhD, 1978, University of Tennessee

Brown, Thomas Miller, *Associate Professor of Entomology, Fisheries, and Wildlife.* BS, Adrian College, 1970; MS, 1971, PhD, 1973, Michigan State University

Brown, William Glynn, Jr., *Professor of Animal Science, Sandhill Experiment Station.* BS, University of Tennessee, 1953; MS, Oklahoma State University, 1958; PhD, University of Arkansas, 1973

Brownlee, Edward Hazelton, Jr., *Visiting Assistant Professor of Computer Science.* BS, Georgia Institute of Technology, 1968; MS, 1970, PhD, 1975, University of North Carolina

Bryan, Edward Lewis, *Assistant Professor of Accounting.* BS, U.S. Naval Academy, 1961; MS, 1966, DBA, 1980, George Washington University

Bryan, Joseph Kent, *Associate Professor of Electrical and Computer Engineering.* BSEE, 1966, MSEE, 1968, PhD, 1971, University of Missouri (Columbia)

Bryant, Hallman Bell, *Associate Professor of English.* BA, Emory University, 1959; MA, University of North Carolina, 1962; PhD, Vanderbilt University, 1967

Buckner, Sam Levi, *Associate Professor of Education.* BS, East Tennessee State University, 1960; MA, Appalachian State University, 1966; EdD, Auburn University, 1970

Bunn, Joe Millard, *Professor of Agricultural Engineering.* BS, 1955, MS, 1957, North Carolina State University; PhD, Iowa State University, 1960

Burati, James Louis, *Assistant Professor of Civil Engineering.* BS, Virginia Polytechnic Institute an State University, 1974; MS, Ohio State University, 1975

Burati, Peggy Large, *Visiting Assistant Professor of Engineering Graphics.* BS, Virginia Polytechni Institute and State University, 1974

Burch, Elmer Earl, Jr., *Professor of Management and Mathematical Sciences.* BS, 1966, MS, 196 PhD, 1970, Clemson University

Burke, Thomas Edward, *Associate Professor of Engineering.* BS, Michigan State University, 195 SM, Massachusetts Institute of Technology, 1955; PhD, University of Texas, 1969

Burkett, Byron Verner, Jr., *Associate Professor of Industrial Education.* BS, 1964, MInEd, 196 Clemson University; PhD, University of South Carolina, 1976

Burley, Robert Hanna, *Clinical Director of Physical Medicine; Lecturer in Nursing.* BA, Vanderbi University, 1948; MD, Medical University of South Carolina, 1952

Burnett, George Wesley, *Associate Professor of Recreation and Park Administration.* BA, Souther Methodist University, 1966; MSLS, Our Lady of the Lake University, 1970; MA, 1974, PhD, 197 University of Oklahoma

Burrows, Peter Michael, *Professor of Experimental Statistics.* BSc, University of Manchest (England), 1960; PhD, North Carolina State University, 1971

Burt, Philip Barnes, *Head of Physics and Astronomy Department; Professor of Physics.* BA, 195 MS, 1958, PhD, 1961, University of Tennessee

Burtner, Frank Alan, *Professor of Sociology.* BA, MA, University of Texas, 1938; PhD, University c North Carolina, 1958

Busching, Herbert William, *Professor of Civil Engineering.* BA, BSCE, Valparaiso University, 195 MSCE, 1963, PhD, 1967, Purdue University

Butler, John Harrison, *Head of Music Department; Professor of Music.* BME, West Texas Stat University, 1955; MFA, 1960, EdD, 1968, University of Georgia

Butler, John Kendrick, Jr., *Assistant Professor of Management.* BS, Brown University, 1963; MB Michigan State University, 1970; DBA, Florida State University, 1977

Buzas, Martin Alexander, *Adjunct Professor of Zoology.* BA, University of Connecticut, 1958; M Brown University, 1960; PhD, Yale University, 1963

Byars, Edward Ford, *Executive Assistant to the President; Professor of Mechanical Engineering an Engineering Mechanics.* BME, 1946, MCE, 1953, Clemson University; PhD, University of Illinoi 1957; PE

Byerley, Neil Elmore, *Lecturer in Accounting.* BSBA, University of Tennessee, 1958; MA, Universit of Florida, 1971; CPA

Byrd, Wilbert Preston, *Chairman, Experimental Statistics Unit; Professor of Experimental Statistic* BS, 1949, MS, 1952, North Carolina State University; PhD, Iowa State University, 1955; Po Doctorate, Oregon State University, 1971

Bzdyl, Donald Gregory, *Assistant Professor of English.* BA, University of Miami, 1970; MA, 197 PhD, 1977, University of Illinois

Caban, Jose Rafael, *Associate Professor of Planning Studies.* BArch, Clemson University, 196 MCD, University of Liverpool (England), 1971; AIA, AIP

Cain, David Wayne, *Assistant Professor of Horticulture.* BS, University of Maine, 1972; MS, 197 PhD, 1978, Michigan State University

Caldwell, Judith Dawn, *Assistant Professor of Horticulture.* BS, 1975, MS, 1977, Virginia Pol technic Institute and State University; PhD, University of Arkansas, 1980

Caley, Paul Cochran, *Professor of Industrial Education.* BS, 1963, MA, 1964, PhD, 1969, Ohio Stat University

Calhoun, Richard James, *Alumni Professor of English.* BA, George Peabody College, 1948; M Johns Hopkins University, 1950; PhD, University of North Carolina, 1959; Post Doctorate, Du University, 1964-65

Calvez, Daniel Jean, *Assistant Professor of French.* License es Lettres, Angers University, 1965; Ph University of Georgia, 1980

Campbell, Becky Fields, *Assistant Professor of Nursing.* BSN, 1974, MS, 1977, Clemson Universi

Campbell, William Warren,* *Instructor in Music; Director of Choral Activities.* BM, Tex Wesleyan College, 1966; MM, Southern Methodist University, 1970

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Camper, Nyal Dwight, *Professor of Plant Pathology and Physiology and of Botany.* BS, 1962, PhD, 1966, North Carolina State University

Canavera, David Stephen, *Adjunct Associate Professor of Forestry.* BS, Michigan Technological University, 1961; MS, 1967, PhD, 1969, Michigan State University

Cantrell, Harley Furman, *Adjunct Associate Professor of Microbiology.* BS, Furman University, 1961; MS, University of North Carolina, 1965; PhD, Clemson University, 1968; Post Doctorate, 1968-69; MT (ASCP); MI (ASCP)

Cantrell, Rayford Stephen, *Assistant Professor of Management and Economics.* BS, University of Alabama, 1972; MS, University of Kentucky, 1974; PhD, North Carolina State University, 1982

Carmack, Veronica Deloria, *Associate Professor of Home Economics.* BS, University of Kentucky, 1965; MS, University of Tennessee, 1969

Carner, Gerald Roy, *Professor of Entomology, Fisheries, and Wildlife.* BA, Asbury College, 1964; MS, 1966, PhD, 1969, Auburn University

Carney, Elizabeth Donnelly, *Assistant Professor of History.* BA, Smith College, 1969; MA, 1973, PhD, 1975, Duke University

Carrillo, Loretta,* *Assistant Professor of English.* BA, St. Mary's University (Texas), 1972; MA, 1974, PhD, 1979, Michigan State University

Carroll, June Langley, *Associate District Extension Leader; Associate Professor of Home Economics.* BS, Winthrop College, 1954

Carter, George Emitt, Jr., *Associate Professor of Plant Pathology and Physiology.* BS, 1968, MS, 1970, Wake Forest University; PhD, Clemson University, 1973

Cash, Luther Stephen, *Assistant Professor of Accounting.* BS, 1963, JD, 1968, University of Tennessee; LLM, University of Washington, 1972

Caskey, Claire Omar, *Associate Professor of English.* BS, Appalachian State University, 1947; MA, Duke University, 1948

Castro, Walter Ernest, *Professor of Mechanical Engineering and Engineering Mechanics.* BS, Indiana Institute of Technology, 1959; MS, Clemson University, 1962; PhD, University of West Virginia, 1966; PE

Cely, Marvin Singleton, Jr., *District Extension Leader; Associate Professor of Horticulture.* BS, 1957, MS, 1970, Clemson University

Ceruzzi, Paul Edward, *Assistant Professor of History.* BA, Yale University, 1970; MA, 1974, PhD, 1981, University of Kansas

Chao, Eugene Thomas, *Visiting Assistant Professor of Psychology.* BA, Mercer University, 1972; MS, 1975, PhD, 1979, Florida State University

Chapin, Jay Willard, *Assistant Professor of Entomology, Fisheries, and Wildlife.* BS, Dickinson College, 1970; MA, East Carolina University, 1975; PhD, Clemson University, 1978

Chaplin, Robert Lee, Jr., *Professor of Physics.* BS, Clemson University, 1948; MS, 1953, PhD, 1962, North Carolina State University.

Chapman, Stephen Richard, *Associate Dean, Director of Instruction, College of Agricultural Sciences; Professor of Agronomy and Soils.* BS, 1959, MS, 1963, PhD, 1966, University of California (Davis)

Chappell, William Fred, *Visiting Assistant Professor of Economics.* BA, Jacksonville State University, 1976

Chasteen, William Harold, *Adjunct Assistant Professor of Engineering Technology.* BS, Central New England College of Technology, 1974; MS, Mount St. Mary's College, 1979

Chen, Thomas Chung-Shan, *Visiting Instructor in Chemistry.* BA, National Cheng-Kung University, 1961; MS, 1970, PhD, 1975, University of Alabama

Chernecky, Cynthia Cecilia, *Instructor in Nursing.* BSN, University of Connecticut, 1977; MN, University of Pittsburgh, 1980

Childress, William Harold, Jr., *Visiting Instructor in Agricultural Engineering.* BS, 1974, MAgEd, 1975, Clemson University

Chisman, James Allen, *Acting Head of Industrial Engineering Department; Professor of Industrial Engineering.* BS, University of Akron, 1958; MS, 1960, PhD, 1963, University of Iowa; PE

Cholewinski, Frank Michael, *Professor of Mathematical Sciences.* EP, 1958, MS, 1959, Auburn University; PhD, Washington University, 1964

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Christenbury, Gerald Davis, *Associate Professor of Agricultural Engineering, Pee Dee Experiment Station.* BS, North Carolina State University, 1964; MS, Clemson University, 1966; PhD, Iowa State University, 1975

Christoph, Richard Thomas, *Lecturer in Management.* BS, 1974, MA, 1977, Clemson University

Clark, Helen Marie, *Assistant Professor of Sociology.* BS, 1951, MS, 1955, University of Utah; PhD, Emory University, 1973

Clark, James Edwin, *Acting Head of Civil Engineering Department; Professor of Civil Engineering.* BSCE, 1957, MS, 1964, University of South Carolina; PhD, North Carolina State University, 1967; PE

Clark, Lawrence Stanley, *Associate Professor of Accounting.* BBA, Augusta College, 1968; MAcct, University of Georgia, 1970; CPA; CMA

Clinkscales, William Cherry, *Assistant to the State 4-H Leader; Associate Professor of Agricultural Education.* BS, South Carolina State College, 1965; MS, Clemson University, 1974

Clouse, Van George Haven, *Visiting Instructor in Management.* BA, Wofford College, 1970; MS, Clemson University, 1982

Clugston, James Paul, *Adjunct Associate Professor of Entomology, Fisheries, and Wildlife.* BS, 1958, MS, 1959, Pennsylvania State University; PhD, University of Georgia, 1973

Cochran, David Ross, *Assistant Professor of Electrical and Computer Engineering.* BS, University of Notre Dame, 1973; MS, 1977, PhD, 1981, Southern Methodist University

Cody, Jack Benjamin, *Associate Professor of Forestry.* BS, 1954, MF, 1963, University of Michigan

Cody, Mildred McInnis, *Assistant Professor of Home Economics.* BS, 1971, MS, 1973, University of Georgia; PhD, Rutgers University, 1978

Cody, William Bermond, *Visiting Assistant Professor of Political Science.* BA, 1971, MA, 1973, University of Georgia; PhD, New School for Social Research, 1980

Coffeen, William Weber, *Professor of Ceramic Engineering.* BS, 1935, MS, 1937, University of Illinois; PhD, Rutgers University, 1969

Colacino, James Michael, *Assistant Professor of Zoology.* BA, St. John Fisher College, 1968; MA, 1970, PhD, 1973, State University of New York (Buffalo)

Cole, Spurgeon Nothern, *Professor of Psychology.* AB, 1960, MS, 1965, PhD, 1966, University of Georgia

Collier, John Anton, *Assistant Professor of Agricultural Engineering.* BA, Georgia Institute of Technology, 1970; MS, University of Georgia, 1972; PhD, Clemson University, 1978; PE

Collins, Donald Lynn, *Professor of Architecture.* BLA, North Carolina State University, 1968; MLA, Harvard University, 1969; ASLA

Collins, Joel Allen, *Associate Professor of Dairy Science.* BSA, 1962, MS, 1964, University of Tennessee; PhD, University of Kentucky, 1968

Collins, Thomas Frank, *Associate Professor of Physics and Astronomy.* AB, Mercer University, 1956; MS, Clemson University, 1958

Colson, Sammy Lynn, *Instructor in Education; Head Track Coach.* BS, University of Kansas, 1974; MEd, Clemson University, 1976

Coltman, Ralph Read, Jr., *Adjunct Professor of Physics.* BS, Carnegie-Mellon University, 1949

Connor, Anthony Cooper, *Lecturer in Computer Science.* BS, 1957, MA, 1964, Temple University

Connor, David Richards, *Visiting Lecturer in Computer Science.* BA, University of Pennsylvania, 1960

Conover, Richard Allan, Jr., *Associate Professor of Recreation and Park Administration.* BA, University of Michigan, 1953; MA, University of Wisconsin, 1968; PhD, Colorado State University, 1974

Cook, Bruce Farrell, *Director of Bands; Associate Professor of Music.* BME, 1954, MA, 1965, West Texas State University; DMA, University of Texas, 1975

Cook, Wilton Pierce, *Associate Professor of Horticulture.* BS, 1962, MS, 1964, Clemson University

Cooke, Francis Walter, *Head of Interdisciplinary Studies Department; Professor of Bioengineering and Materials Engineering.* BS, Notre Dame University, 1957; PhD, Rensselaer Polytechnic Institute, 1966

Cool, Bingham Mercur, *Professor of Forestry.* BS, Louisiana State University, 1940; MS, Iowa State University, 1941; PhD, Michigan State University, 1957

Cooledge, Harold Norman, Jr., *Alumni Professor of Architectural History.* BS, 1944, BArch, 1950, Harvard University; MA, 1957, PhD, 1964, University of Pennsylvania

Cooler, Ernest Wesley III, *Assistant Professor of Military Science.* Capt., U.S. Army; BS, Clemson University, 1973

Cordell, Harold Kenneth, *Adjunct Associate Professor of Forest and Recreation Resources.* BSF, 1966, MF, 1967, PhD, 1975, North Carolina State University

Corder, William Owens, *Professor of Education.* BA, University of South Carolina, 1947; MS, Clemson University, 1957; EdS, Peabody College, 1965; EdD, University of Virginia, 1969

Coston, Donald Claude, *Associate Professor of Horticulture.* BS, North Carolina State University, 1972; MS, 1974, PhD, 1976, Michigan State University

Cottle, Rex Lee, *Head of Economics Department; Professor of Economics.* BS, Weber State College, 1970; PhD, Texas A&M University, 1974

Cottrell, Willard Charles, *Visiting Instructor in Music.* BM, Westminster Choir College, 1973; MA, Trenton State College, 1978

Coulter, Edwin Martin, *Associate Professor of Political Science.* BA, Furman University, 1962; PhD, University of Virginia, 1965

Cover, Alan Seymour, *Associate Professor of Mathematical Sciences.* BS, Indiana State University, 1954; MA, 1960; PhD, 1964, Pennsylvania State University

Craddock, Garnet Roy, *Head of Agronomy and Soils Department; Professor of Agronomy and Soils.* BS, Virginia Polytechnic Institute, 1952; PhD, University of Wisconsin, 1955

Crader, Kelly Wayne, *Associate Professor of Sociology.* BS, MS, 1968, Illinois State University; PhD, Emory University, 1971

Craig, James Telford, *Professor of Agricultural Engineering.* BS, Clemson University, 1951; MS, University of Georgia, 1960; RIBA, APA, SAI

Craig, Lynn George, *Associate Professor of Architecture.* BArch, Clemson University, 1967; MArch, Washington University, 1969

Cranston, Metchild, *Assistant Professor of French.* BA, 1958, PhD, 1966, University of California

Crobsy, Margaree Seawright, *Assistant Professor of Education.* BS, South Carolina State College, 1963; MEd, Clemson University, 1973; EdD, University of Massachusetts, 1976

Cross, Dee Lewis, *Professor of Animal Science.* BS, Austin Peay State University, 1968; MS, 1971, PhD, 1973, University of Kentucky

Cross, Sydney Ann, *Assistant Professor of History and Visual Studies.* BFA, Northern Arizona University, 1977; MFA, Arizona State University, 1980

Crouch, James Page, *Professor of Industrial Education.* AB, 1964, MA, 1966, San Diego State College; EdD, University of Missouri, 1968

Crowe, Edythe Joyce, *Visiting Instructor in Nursing.* BSN, Medical College of Georgia, 1971; MN, Emory University, 1972

Culin, Joseph Dayton, *Assistant Professor of Entomology, Fisheries, and Wildlife.* BS, Eastern College, 1975; MS, University of Delaware, 1977; PhD, University of Kentucky, 1981

Culp, Thomas Wade, *Adjunct Professor of Agronomy and Soils.* BS, Clemson University, 1951; MS, 1953, PhD, 1956, Texas A&M University

Cunningham, Bennie Lee, *State Leader, Extension Special Programs; Associate Professor of Agricultural Education.* BS, 1948, MS, 1957, South Carolina State College

Currin, Robert Eugene III, *Professor of Agronomy and Soils, Pee Dee Equipment Station.* BS, North Carolina State University, 1949; MS, Clemson University, 1964

Czajkowski, Anthony Francis, *Associate Professor of Management.* BEE, Manhattan College, 1958; MS, 1963, PhD, 1972, Arizona State University

Daigle, John Nelson, *Associate Professor of Electrical and Computer Engineering.* BS, Louisiana Tech University, 1968; MS, Virginia Polytechnic Institute and State University, 1970; ScD, Columbia University, 1977

Dakutis, Peter Jerome, *Instructor in English.* BA, 1979, MA, 1981, University of New Orleans

Dalton, James Edward, *Assistant to the Dean, College of Architecture; Professor of Architecture.* BArch, Miami University, 1964; MArch, University of Minnesota, 1965; AIA

Daniels, James Howard, *Associate Professor of Agricultural Education and Agricultural Engineering.* BSE, University of Arkansas, 1970; MEd, 1974, EdD, 1975, University of Illinois

Davenport, John Douglas, *Professor of Psychology.* BS, Clemson University, 1943; MA, Furman University, 1958; PhD, University of Maryland, 1967

Davis, Jack Wayne, *Visiting Instructor in Agricultural Engineering.* BS, 1975, MAg, 1976, Clemson University

Davis, James Richard, *Director of School of Accountancy; Acting Head of Finance Department; Professor of Accounting.* BBA, 1968, MPA, 1970, PhD, 1974, Georgia State University; CMA

Davis, Jerry Brantley, *Assistant Professor of Agricultural Engineering.* BS, 1971, MS, 1972, University of Georgia; PhD, Clemson University, 1977

Davis, Lee Edward, *Assistant Professor of Accounting.* BBA, 1965, MBA, 1967, Georgia State University; PhD, University of Georgia, 1981

Davis, Martin Alan, *Associate Professor of Architecture.* BArch, University of Oklahoma, 1971; MPhil, University of Edinburgh (Scotland), 1973

Davis, Maureen Flynn, *Assistant Professor of Nursing.* BSN, Creighton University, 1965; MSN, University of Nebraska, 1976

Davis, Rose Jones,* *Associate Professor of Home Economics.* BS, 1962, MS, 1964, Winthrop College

Dawes, Awtry Stephen, *Assistant Professor of Psychology.* BA, Clemson University, 1969; MS, 1971, PhD, 1974, University of Georgia

Day, Frank Louis, *Associate Professor of English.* BS, Gorham State College, 1954; MA, University of Tennessee, 1959; MA, University of Rochester, 1967

Deal, Charles Thomas, *Assistant Professor of Marketing.* BS, Florida State University, 1970; JD, University of South Carolina, 1976

Deal, Pamela Ellis, *Lecturer in Marketing.* BA, Florida State University, 1971; MAT, University of South Carolina, 1972; JD, University of Georgia, 1981

Dearing, Perino Marcellin, Jr., *Associate Professor of Mathematical Sciences.* BS, 1963, MA, 1965, University of North Carolina; ME, 1971, PhD, 1972, University of Florida

Delumyea, Richard Gilbert, *Assistant Professor of Chemistry.* BS, Rochester Institute of Technology, 1970; MS, 1972, PhD, 1974, Wayne State University

Delwiche, Michael Joseph, *Assistant Professor of Agricultural Engineering.* BS, 1974, MS, 1976, PhD, 1981, Cornell University

Derr, Alice Miriam, *Assistant Professor of Education.* BA, College of William and Mary, 1970; MEd, University of Virginia, 1974; EdD, University of Arizona, 1980

Desmarteau, Darryl Dwayne, *Head of Chemistry and Geology Department; Professor of Chemistry.* BS, Washington State University, 1963; PhD, University of Washington, 1966

DeWitt, Craig Allen, *Visiting Instructor in Agricultural Engineering.* BS, Clemson University, 1976

Dezen, Jeffrey Louis, *Instructor in English.* BA, Dickinson College, 1977; MA, Pennsylvania State University, 1979

Dick, John Walter, *Professor of Poultry Science.* BA, Tabor College, 1965; MS, 1968, PhD, 1971, Kansas State University

Dickerson, Ottie Joseph, *Head of Plant Pathology and Physiology Department; Professor of Plant Pathology and Physiology; State Plant Pathologist.* BS, 1955, MS, 1956, University of Arkansas; PhD, University of Wisconsin, 1961

Dickey, Joseph Freeman, *Professor of Dairy Science.* BS, 1956, MS, 1962, North Carolina State University; PhD, Pennsylvania State University, 1965

Diehl, John Richard, *Associate Professor of Animal Science.* BS, Kansas State University, 1965; PhD, University of Missouri, 1973

Dill, Kilian, *Assistant Professor of Chemistry.* BA, City University of New York, 1971; PhD, California Institute of Technology, 1977

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Dillman, Buddy Leroy, *Professor of Agricultural Economics and Rural Sociology.* BS, 1959, MS, 1961, University of Arkansas; PhD, North Carolina State University, 1967

Dillon, Charles Ronald, *Head of Botany Department; Professor of Botany.* AB, 1965, MA, 1968, PhD, 1971, University of North Carolina

Dimeglio, Sebastian Joseph, *Adjunct Professor of Travel and Tourism.* BS, Mount St. Mary's College, 1953

Dimond, Thomas, *Assistant Professor of Visual Studies.* BFA, Massachusetts College of Art, 1966; MFA, University of Tennessee, 1969

Dixon, Marvin Warren, *Professor of Mechanical Engineering.* BS, 1964, MS, 1965, Louisiana State University; PhD, Northwestern University, 1971; PE

Dodd, Roy Bryon, *Instructor in Agricultural Engineering.* BS, 1968, MS, 1977, University of Georgia

Donahue, George Michael, *Visiting Instructor in English.* BA, University of Delaware, 1974; MA, Clemson University, 1979

Donnelly, Leonard Scott, *Assistant Professor of Food Science.* BA, St. Olaf College, 1974; MS, Iowa State University, 1976; PhD, University of Minnesota, 1981

Dottavio, Floyd Dominic, *Adjunct Associate Professor of Recreation and Park Administration.* BS, Ohio State University, 1973; MFS, Yale University, 1975; PhD, Purdue University, 1979

Doty, Coy William, *Adjunct Associate Professor of Agricultural Engineering.* BS, Auburn University, 1958; MS, South Dakota State University, 1968

Dover, Ernest Adam, Jr., *Instructor in Political Science.* BA, Winston-Salem State University, 1976; MA, Kent State University, 1978

Downing, Robert Lee, *Adjunct Associate Professor of Forest and Recreation Resources.* BS, Texas A&M University, 1952; MS, Oklahoma A&M University, 1957

Drake, Thomas Lynn, *Professor of Electrical and Computer Engineering.* BS, Tri-State College, 1958; MS, 1959, PhD, 1964, Michigan State University

Dreskin, Ervin Arthur, *Adjunct Professor of Medical Technology; Director, School of Medical Technology, Greenville General Hospital.* BS, 1940, MD, 1971, Medical University of South Carolina

Drew, Leland Overbey, *Visiting Professor of Engineering Technology.* BS, Clemson University, 1943; MS, Iowa State University, 1945; PhD, Michigan State University, 1963; PE

Drews, Michael James, *Associate Professor of Textiles.* BS, University of Wisconsin, 1967; PhD, North Texas State University, 1971

Drye, Charles Edwin, *Assistant Professor of Plant Pathology and Physiology, Edisto Experiment Station.* BS, Lenoir-Rhyne College, 1969; MA, Appalachian State University, 1972; PhD, Clemson University, 1976

DuBose, William Perry III, *Visiting Assistant Professor of Entomology, Fisheries, and Wildlife.* BS, Clemson University, 1957; MS, 1959, PhD, 1967, North Carolina State University

Duffy, Bernard Karl, *Assistant Professor of Speech.* BA, 1970, MA, 1971, San Jose State University; PhD, University of Pittsburgh, 1976

Duffy, Susan, *Assistant Professor of English.* BA, Seton Hill College, 1973; MA, 1974, PhD, 1979, University of Pittsburgh

Duke, Albert Link, *Professor of Electrical and Computer Engineering.* BS, Tennessee Polytechnic Institute, 1948; MS, Virginia Polytechnic Institute, 1955; PhD, Michigan State University, 1963

Dukes, Philip Duskin, *Adjunct Professor of Plant Pathology and Physiology.* BS, Clemson University, 1953; MS, 1960, PhD, 1962, North Carolina State University

Dumin, David Joseph, *Samuel R. Rhodes Professor of Electrical and Computer Engineering.* BS, Johns Hopkins University, 1957; MS, Purdue University, 1961; PhD, Stanford University, 1964

Dunn, Benjamin Allen, *Associate Professor of Forestry.* BSF, 1965, MF, 1968, PhD, 1971, University of Georgia

Dunn, Carol Nelson, *Visiting Instructor in Food Science.* BS, Florida State University, 1964; MS, University of Tennessee, 1966

Dunn, Charles Wythe, *Head of Political Science Department; Professor of Political Science.* BS, Illinois State University, 1962; MS, 1963, PhD, 1965, Florida State University

DuRant, John Alexander III, *Professor of Entomology, Fisheries, and Wildlife, Pee Dee Experiment Station.* BS, 1961, MS, 1963, Clemson University; PhD, Auburn University, 1966

Durham, Bill Gravely, *Assistant Professor of Spanish.* AB, Wofford College, 1949; MEd, Furman University, 1960

Dusenberry, James Franklin, *Adjunct Professor of Bioengineering.* BS, Erskine College, 1960; MD, Medical University of South Carolina, 1968

Duvall, Arline Marie, *Professor of Nursing.* BSPHN, University of North Carolina, 1956; MPH, University of Michigan, 1959; EdD, Columbia University, 1972

Dyck, Lawrence Alan, *Associate Professor of Botany.* AB, University of California (Los Angeles), 1965; PhD, Washington University, 1970

Dysart, Benjamin Clay III, *Professor of Environmental Systems Engineering.* BE, 1961, MS, 1964, Vanderbilt University; PhD, Georgia Institute of Technology, 1969

Edge, Billy Lee,* *Professor of Civil Engineering.* BSCE, 1964, MSCE, 1965, Virginia Polytechnic Institute of Technology; PhD, Georgia Institute of Technology, 1968; PE

Edie, Danny Dale, *Professor of Chemical Engineering.* BS, Ohio University, 1965; MSES, The University of Toledo, 1969; PhD, University of Virginia, 1972

Edwards, James Leon, *Assistant Dean, College of Engineering; Professor of Mechanical Engineering.* BME, Clemson University, 1941; MS, Pennsylvania State University, 1951; PE

Edwards, Robert Lee, *Professor of Animal Science.* BS, Berea College, 1946; MS, 1954, PhD, 1958, North Carolina State University

Efland, Thomas Daniel, *Associate Dean, Director of Research, College of Commerce and Industry; Professor of Textiles.* BS, North Carolina State University, 1949; MS, Georgia Institute of Technology, 1956

Eflin, Robert Dean, *Associate Professor of Architecture.* BArch, University of Minnesota, 1954; MArch, Rice University, 1972

Egan, Clifton Scott Miller, *Associate Professor of Drama.* BA, Hanover College, 1973; MFA, Northwestern University, 1976

Egan, Linda Diane, *Instructor in Speech.* BA, Hanover College, 1972; MA, Northwestern University, 1975

Egan, Martin David, *Associate Professor of Building Science.* BS, Lafayette College, 1962; MS, Massachusetts Institute of Technology, 1966

Eisiminger, Sterling Kenwood, *Associate Professor of English.* BS, 1967, MA, 1968, Auburn University; PhD, University of South Carolina, 1974

Elling, Rudolf Ernest,* *Associate Professor of Civil Engineering and Engineering Mechanics.* BS, Michigan State University, 1950; MS, University of Illinois, 1952; PhD, Stanford University, 1967; PE

Ellison, Carolyne Lyles, *Visiting Assistant Professor of English.* BA, Converse College, 1968; MA, 1977, PhD, 1981, University of South Carolina

Elliott, Ralph Delano, *Director of Professional Development, College of Commerce and Industry; Professor of Economics.* BS, 1967, MS, 1968, PhD, 1972, North Carolina State University

Elrod, Alvon Creighton, *Associate Professor of Mechanical Engineering.* BME, 1949, MME, 1951, Clemson University; PhD, Purdue University, 1959; PE

Elzerman, Alan William, *Associate Professor of Environmental Systems Engineering.* BA, Williams College, 1971; PhD, University of Wisconsin, 1976

England, Robert Durant, *Adjunct Professor of Art and Architectural History.* BA, University of Virginia, 1928; MA, Oglethorpe College, 1934

Ersenkal, Caryl Ruppert, *Visiting Assistant Professor of Economics.* BA, Manhattanville College, 1971; MUP, New York University, 1975; PhD, Clemson University, 1981

Ersenkal, Olgun, *Associate Professor of Planning Studies.* Dipling, Black Sea Technical University, 1969; MUP, 1974, PhD, 1981, New York University

Eskew, Elias Benton, *Associate Professor of Agronomy and Soils.* BS, Clemson University, 1943; MS, Ohio State University, 1951

Evans, John Stephen, *Head of Department of Farms; Lecturer in Agricultural Engineering.* BS, Clemson University, 1948

*On leave.

Evers, Dolores Anita, *Acting Director of Continuing Education in Nursing; Assistant Professor of Nursing.* BS, Syracuse University, 1966; MS, University of California, 1968

Eversole, Arnold George, *Associate Professor of Entomology, Fisheries, and Wildlife.* BS, Pennsylvania State University, 1963; MS, 1969, PhD, 1974, Syracuse University

Ezell, Danny Odell, *State Leader, Extension Field Operations; Professor of Horticulture.* BS, 1962, MS, 1964, Clemson University; PhD, University of Florida, 1968

Fain, Charles Clifford, *Professor of Ceramic Engineering.* BCerE, 1954, MS, 1957, Clemson University; PhD, Ohio State University, 1967

Fairbanks, Patricia Ann, *Instructor in English.* BA, Northern Kentucky University, 1977; MA, University of Cincinnati, 1980

Fairey, John Edward III, *Associate Professor of Botany.* BS, University of South Carolina, 1962; MS, 1964, PhD, 1972, University of West Virginia

Falk, Edward Lockwood, *Head of Planning Studies Department; Professor of Planning Studies.* BA, 1950, MA, 1951, University of Minnesota; MRP, University of North Carolina, 1961; DPA, University of Georgia, 1979; AIP

Falkowitz, Mordechai, *Visiting Assistant Professor of Mathematical Sciences.* BS, 1963, MS, 1967, PhD, 1981, Hebrew University of Jerusalem

Fanning, James Collier, *Professor of Chemistry.* BS, The Citadel, 1953; MS, 1956, PhD, 1960, Georgia Institute of Technology; Post Doctorate, Tulane University, 1960-61

Faris, Jesse Edwin,* *Professor of Agricultural Economics and Rural Sociology.* BS, 1948, MA, 1951, Washington State University; PhD, North Carolina State University, 1955

Fassuliotis, George, *Adjunct Professor of Plant Pathology and Physiology.* BS, Brooklyn College, 1949; MS, 1954, PhD, 1958, New York University

Fendley, Timothy Thomas, *Associate Professor of Entomology, Fisheries, and Wildlife.* BSF, 1965, MSF, 1968, University of Georgia; PhD, Utah State University, 1978

Fennell, Robert Emmett, *Associate Professor of Mathematical Sciences.* BA, Bradley University, 1964; MS, 1966, PhD, 1969, University of Iowa

Fera, Cesare, *Professor of Architecture.* LaureaIng, 1948, LibDoctoreArch, 1966, University of Genoa (Italy)

Fernandez, Elena Gonzales, *Lecturer in Spanish.* AB, Instituto de la Habana, 1942

Fernandez, Gaston Juan, *Professor of Spanish.* BLS, Instituto de Segunda Ensenanza de Remedios; LLD, University of Havana, 1942; MA, University of North Carolina, 1967; PhD, University of Kentucky, 1971

Ferreira, Eurico Jose, *Assistant Professor of Finance.* BS, Federal University of Rio de Janerio, 1964; MS, Catholic University of Rio de Janerio, 1975; PhD, University of South Carolina, 1982

Fichter, Wilbur Bryan, *Adjunct Professor of Engineering Mechanics.* BS, Wake Forest University, 1957; MS, Virginia Polytechnic Institute and State University, 1966; PhD, North Carolina State University, 1969

Fieler, Eleanor Roth, *Visiting Instructor in Chemical Engineering.* BS, St. Louis University, 1971; MS, Louisiana State University, 1976

Figliola, Richard Stephen, *Assistant Professor of Mechanical Engineering.* BS, 1974, MS, 1976, PhD, 1979, University of Notre Dame

Fisher, Lorraine Rodriques, *Instructor in Nursing.* BSN, University of Bridgeport, 1966; MA, University of South Florida, 1975; MS, Clemson University, 1982

Fitch, Lewis Thomas, *Professor of Electrical and Computer Engineering.* BSEE, Duke University, 1954; MS, North Carolina State University, 1960; PhD, Ohio State University, 1969; PE

Fjeld, Robert Alan, *Associate Professor of Environmental Systems Engineering.* BS, North Carolina State University, 1970; MS, 1973, PhD, 1976, Pennsylvania State University

Flatt, James Levern, *Associate Professor of Mathematical Sciences.* BS, Bethel College, 1949; MA, 1950, PhD, 1965, George Peabody College

Fleming, Horace Weldon, Jr., *Acting Director, Strom Thurmond Institute; Associate Professor of Political Science.* BA, 1965, MA, 1966, University of Georgia; PhD, Vanderbilt University, 1973

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Fletcher, George Robert, *Visiting Associate Professor of Engineering Technology.* BS, North Georgia College, 1966; MS, 1968, PhD, 1973, Clemson University

Florey, Francis Gary, *Adjunct Professor of Mathematical Sciences.* MA, University of Illinois, 1962; PhD, Illinois Institute of Technology, 1970

Flower, Phillip John, *Assistant Professor of Physics and Astronomy.* BS, University of Toledo, 1970; PhD, University of Washington, 1976

Foltz, Jeffrey Wayne, *Assistant Professor of Entomology, Fisheries, and Wildlife.* BS, Ohio State University, 1972; MS, University of Wisconsin, 1974; PhD, University of Colorado, 1978

Foreman, Christopher William, *Lecturer in Computer Science.* BS, Salisbury State College, 1975; MS, Clemson University, 1976

Fortnum, Bruce Allan, *Assistant Professor of Plant Pathology and Physiology, Pee Dee Experiment Station.* BA, LaSalle College, 1973; MS, University of Delaware, 1975; PhD, Clemson University, 1978

Fowler, Jimmy Eugene, *Visiting Assistant Professor of Civil Engineering.* BS, 1975, ME, 1979, PhD, 1982, Clemson University

Frazier, Michael Anthony, *Assistant Professor of Aerospace Studies.* Lt. Col., U.S. Air Force; BA, Western Carolina University, 1967; MA, Wichita State University, 1976

Freeman, Edwin Armistead, *Associate Professor of Music.* BS, Clemson University, 1949; BMus, Louisiana State University, 1954; MA, Columbia University, 1968; DMA, Louisiana State University, 1976

Freeze, Chester Richard, *Professor of Education.* BS, Marion College, 1953; MEd, University of South Dakota, 1954; EdD, University of Alabama, 1963

Friedlob, George Thomas, *Associate Professor of Accounting.* BA, Vanderbilt University, 1963; MBA, University of Louisville, 1972; PhD, University of Mississippi, 1981; CPA; CMA

Frobish, Lowell Thomas, *Head of Animal Science Department; Professor of Animal Science.* BS, University of Illinois, 1962; MS, 1964, PhD, 1967, Iowa State University

Fulmer, John Patrick, *Professor of Horticulture.* BS, 1953, MS, 1955, Clemson University

Fulton, John David, *Head of Mathematical Sciences Department; Professor of Mathematical Sciences.* BS, 1960, MS, 1963, PhD, 1965, North Carolina State University

Funchess, William Herbert, *District Extension Leader; Associate Professor of Agronomy and Soils.* BS, 1948, MS, 1960, Clemson University

Gaddis, Joseph Leo, *Professor of Mechanical Engineering.* BS, 1961, MS, 1963, New Mexico State University; PhD, University of Texas, 1969

Gaffney, Edith Anne, *Instructor in Home Economics.* BS, University of Missouri, 1952

Gahan, Lawrence Willard, *Professor of Recreation and Park Administration.* BS, 1960, MS, 1964, PhD, 1970, University of Illinois.

Gahan, Linda Cline, *Research Associate/Assistant Professor of Biochemistry.* BS, Bucknell University, 1964; PhD, University of Illinois, 1968

Gallop, Reginald Ambrose, *Visiting Professor of Food Science.* ASTC, Sydney Technical College (Australia), 1945; MS, 1961, PhD, 1963, Oregon State University

Galloway, Elizabeth Boyce, *Professor of Education.* BA, Erskine College, 1958; MA, Furman University, 1963; EdD, University of Georgia, 1972

Galluscio, Eugene Hugo, *Head of Psychology Department; Professor of Psychology.* BA, California State College, 1966; MA, 1969, PhD, 1970, Louisiana State University

Gambrell, Carl Edwin, Jr., *Associate Professor of Horticulture, Sandhill Experiment Station.* BS, 1948, MS, 1960, Clemson University

Garcia, Ricardo Alberto, *Associate Professor of Biology.* BS, 1968, MEd, 1970, University of Houston; PhD, Texas A&M University, 1975

Garner, Thomas Harold, *Professor of Agricultural Engineering.* BS, 1952, MS, 1956, PhD, 1964, North Carolina State University; PE

Garrett, Thomas Roy, *Instructor in Agricultural Engineering.* BS, 1970, MS, 1974, Clemson University

Garris, John Marshall, *Lecturer in Management.* BA, University of North Carolina, 1965; MS, Clemson University, 1981

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*On leave

Gauthreaux, Sidney Anthony, Jr., *Professor of Zoology.* BS, 1963, MS, 1965, PhD, 1968, Louisiana State University; Post Doctorate, University of Georgia, 1968-70

Geldard, John Francis, *Associate Professor of Chemistry.* BS, 1958, MS, 1959, PhD, 1964, University of Sydney; Post Doctorate, University of Illinois, 1963-65

Gentry, Robert Cecil, *Visiting Professor of Atmospheric Physics.* BS, Murray State University, 1937; PhD, Florida State University, 1963

Gettys, William Edward, *Professor of Physics.* BS, 1960, MS, 1961, Clemson University; PhD, Ohio University, 1964

Gibson, Pryce Byrd, *Lecturer in Agronomy and Soils.* BS, 1938, MS, 1942, Auburn University; PhD, University of Wisconsin, 1950

Gilchrist, Ralph Wayne, *Professor of Electrical and Computer Engineering.* BS, Tri-State College, 1947; MS, University of Michigan, 1951; PhD, Michigan State University, 1960; PE

Gilliland, Bobby Eugene, *Associate Dean, College of Engineering; Professor of Electrical and Computer Engineering.* BS, Louisiana Polytechnic Institute, 1958; MS, 1964, PhD, 1967, University of Arkansas; PE

Gilreath, John Atkins, *Associate Professor of Physics.* BS, 1958, MS, 1960, Clemson University

Gimenez, Tomas, *Assistant Professor of Animal Science.* MVZ, National University of Mexico, 1969; DrMedVet, Institut fur Physiologie Technische Universitat Munchen (Germany), 1975

Ging, John Leonard, *Professor of Physics.* BA, Alfred University, 1953; MS, Carnegie Institute of Technology, 1955; PhD, University of North Carolina, 1960

Godbee, Richard Green II, *Assistant Professor of Animal Science.* BS, 1973, MS, 1975, University of Georgia; PhD, Colorado State University, 1978

Godley, Willie Cecil, *Associate Dean, College of Agricultural Sciences; Director of Agricultural Experiment Station; Professor of Animal Science.* BS, Clemson University, 1943; MS, 1949, PhD, 1955, North Carolina State University

Golden, Jimmy K., *Resident Director of Sandhill Experiment Station; Associate Professor of Plant Pathology and Physiology.* BS, 1965, MS, 1967, University of Georgia; PhD, University of California, 1972

Golden, Richard Martin, *Associate Professor of History.* BA, Vanderbilt University, 1969; MA, 1972, PhD, 1975, Johns Hopkins University

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Gooding, Charles Harold, *Assistant Professor of Chemical Engineering.* BS, 1970, MS, 1972, Clemson University; PhD, North Carolina State University, 1979

Goodstein, Richard Edward, *Instructor in Music; Assistant Director of Bands.* BME, Miami University (Ohio), 1975; MME, Arizona State University, 1981

Goree, James Gleason, *Professor of Mechanical Engineering and Engineering Mechanics.* BS, University of Florida, 1960; MS, University of Washington, 1962; PhD, University of Alabama, 1966

Gorsuch, Clyde Stuart, *Associate Professor Entomology, Fisheries, and Wildlife.* BS, 1971, MS, 1974, PhD, 1978, University of Wisconsin

Gossett, Billy Joe, *Professor of Agronomy and Soils.* BS, University of Tennessee, 1957; MS, 1959, PhD, 1962, University of Illinois

Gowaty, Patricia Adair, *Adjunct Assistant Professor of Zoology.* BA, Tulane University, 1967; PhD, Clemson University, 1980

Gowdy, John Norman, *Professor of Electrical and Computer Engineering.* BS, Massachusetts Institute of Technology, 1967; MS, 1968, PhD, 1971, University of Missouri

Graben, Henry Willingham, *Professor of Physics.* BS, Birmingham-Southern College, 1957; MS, 1961, PhD, 1962, University of Tennessee

Graber, Gary James, *Assistant Professor of Military Science.* Capt., U.S. Army; BS, Oregon State University, 1973

Grady, Cecil Paul Leslie, Jr., *Professor of Environmental Systems Engineering.* BA, Rice Institute, 1960; BS, 1961, MS, 1963, Rice University; PhD, Oklahoma State University, 1969

Graham, William Doyce, Jr., *Professor of Agronomy and Soils.* BS, Texas Technology College, 1962; MS, 1965, PhD, 1967, Purdue University

Gray, Furman Ray, *Associate Professor of Accounting.* BA, Furman University, 1951; MS, University of Georgia, 1967; CPA

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Green, Robert Phillip, Jr., *Assistant Professor of Education.* BA, University of the South, 1970; MA, 1972, EdD, 1977, University of Virginia

Greenspoon, Leonard Jay, *Assistant Professor of History.* BA, 1967, MA, 1970, University of Richmond; PhD, Harvard University, 1977

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Grimes, Lawrence Wade, *Associate Professor of Experimental Statistics.* BS, 1972, MS, 1974, University of Georgia; PhD, Ohio State University, 1978

Grossman, Harold Charles, *Assistant Professor of Computer Science.* BS, University of Cincinnati, 1968; MS, New Mexico State University, 1971; PhD, Michigan State University, 1978

Grove, Harold Jesse, *Associate Professor of Recreation and Park Administration.* BS, 1961, MEd, 1963, Pennsylvania State University

Grubb, Charles Alan, *Assistant Professor of History.* BA, Washington and Lee University, 1963; MA, 1964, PhD, 1969, Columbia University

Guide, Vincent Daniel Richard, *Assistant Professor of Accounting.* BA, University of Kentucky, 1960; MS, Clemson University, 1970

Guynn, David Clair, Jr., *Associate Professor of Forestry.* BS, 1968, MS, 1973, PhD, 1975, Virginia Polytechnic Institute and State University

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Halfacre, Robert Gordon, *Professor of Horticulture.* BS, 1963, MS, 1965, Clemson University; PhD, Virginia Polytechnic Institute and State University, 1968; MLA, North Carolina State University, 1973

Hall, Barbara Jean,* *Instructor in English.* BS, East Carolina University, 1976; MA, Wake Forest University, 1980

Hall, Basil Edwin, *Instructor in Design Shop.* BA, Furman University, 1969

Hall, Lynne Anderson,* *Instructor in Nursing.* BSN, 1974, MS, 1977, Clemson University

Halpin, James Edwin, *Adjunct Professor of Plant Pathology and Physiology.* BS, 1950, MS, 1951, PhD, 1955, University of Wisconsin

Ham, Donald Lee, *Associate Professor of Forestry.* BA, William Jewell College, 1965; MF, 1967, PhD, 1971, Duke University

Hambrecht, Douglas Alan, *Visiting Instructor in Building Science and Management.* BS, Clemson University, 1974; MBC, University of Florida, 1975

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Hamel, Paul Bernard, *Research Associate/Assistant Professor of Zoology.* BS, 1970, MS, 1972, Michigan State University

Hamilton, Max Greene, *Associate Professor of Horticulture, Edisto Experiment Station.* BS, North Carolina State University, 1949; PhD, Cornell University, 1953

Hammig, Michael Dean, *Associate Professor of Agricultural Economics and Rural Sociology.* BA, University of Kansas, 1967; PhD, Washington State University, 1978

Handlin, Dale Lee, *Associate Professor of Animal Science.* BS, Kansas State University, 1951; MS, Texas A&M University, 1954

Haque, Imtiaz-Ul, *Visiting Assistant Professor of Mechanical Engineering.* BS, University of Engineering and Technology (Pakistan), 1971; MS, 1977, PhD, 1982, Clemson University

Haque, Mary Taylor, *Assistant Professor of Horticulture.* BA, Sweet Briar College, 1973; MLA, North Carolina State University, 1978

Harden, John Charles, Jr., *Assistant to the Head, Mathematical Sciences Department; Associate Professor of Mathematical Sciences.* BS, Mississippi College, 1947; MA, University of Tennessee, 1949

Harder, Lillian Utsey, *Assistant Professor of Music.* BA, Coker College, 1965; MM, Converse College, 1967

Hardin, Thurman Craig, *Professor of Mechanical Engineering.* BSME, University of Tennessee, 1946; MSME, Virginia Polytechnic Institute, 1949; PhD, Georgia Institute of Technology, 1965

Hare, Eleanor O'Meara, *Instructor in Computer Science.* BA, Hollins College, 1958; MS, Clemson University, 1973

Hare, William Ray, Jr., *Professor of Mathematical Sciences.* BS, Henderson State Teachers College, 1957; MS, 1959, PhD, 1961, University of Florida

Hargest, Thomas S., *Adjunct Professor of Mechanical Engineering and Bioengineering.* BA, Lafayette College, 1950

Harlow, Richard Fessenden, *Adjunct Associate Professor of Forest and Recreation Resources.* BS, University of Maine, 1947; MS, Virginia Polytechnic Institute and State University, 1971

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Harris, Robert Arthur, *Assistant Professor of Forestry.* BS, 1971, MS, 1974, Clemson University; PhD, Virginia Polytechnic Institute and State University, 1977

Harshman, Richard Calvert, *Professor of Chemical Engineering.* BA, Ohio Wesleyan University, 1947; MS, 1949, PhD, 1951, Ohio State University; PE

Hart, Lillian Blake, *Associate Professor of Education.* BS, Agnes Scott College, 1960; MEd, University of North Carolina, 1962; PhD, University of South Carolina, 1973

Harvey, Lawrence Harmon, *Professor of Agronomy and Soils.* BSA, 1952, MS, 1959, PhD, 1969, University of Georgia

Harwell, Richard Lynn, *State Leader, Extension Agricultural Programs; Associate Professor of Agricultural Economics and Rural Sociology.* BBA, University of Texas, 1951; MS, Texas A&M University, 1970; PhD, Oklahoma State University, 1975

Haselton, George Montgomery,* *Professor of Geology.* BA, Colby College, 1951; MA, Boston University, 1958; PhD, Ohio State University, 1967

Hash, John Alex, *Professor of Agricultural Education.* BS, Virginia Polytechnic Institute, 1956; MS, 1964, EdD, 1969, Cornell University

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Hatcher, John Douglas, *Associate Professor of Textiles.* BS, University of Kentucky, 1963; MS, Georgia Institute of Technology, 1965; PhD, North Carolina State University, 1970

Haun, Joseph Rhodes, *Professor of Horticulture.* AB, Berea College, 1946; MS, 1950, PhD, 1951, University of Maryland

Hawi, Amale Ayyub, *Visiting Instructor in Chemistry.* BS, 1975, MS, 1978, American University (Beirut); PhD, University of London, 1982

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Haymond, Jacqueline Landis, *Instructor in Forestry.* BS, Erskine College, 1971; MS, Clemson University, 1978

Haymond, Robert Edward, *Professor of Mathematical Sciences.* BS, University of South Carolina, 1954; MS, California Institute of Technology, 1956; PhD, University of Oregon, 1959

Hays, Ruth Lanier, *Professor of Zoology.* BA, Berea College, 1962; PhD, Auburn University, 1966

Hays, Sidney Brooks, *Head of Entomology, Fisheries, and Wildlife Department; Professor of Entomology, Fisheries and Wildlife.* BS, 1953, MS, 1958, Auburn University; PhD, Clemson University, 1962

Heckel, David Goodwin, *Assistant Professor of Zoology.* BA, University of Rochester, 1975; PhD, Stanford University, 1980

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Hedetniemi, Sandra Mitchell, *Associate Professor of Computer Science.* BA, Centre College of Kentucky, 1971; MS, 1973, PhD, 1977, University of Virginia

Hedetniemi, Stephen Travis, *Professor of Computer Science.* BS, 1960, MS, 1962, PhD, 1966, University of Michigan

Hegg, Richard Olaf, *Professor of Agricultural Engineering.* BS, South Dakota State University, 1967; MS, University of Missouri, 1968; PhD, University of Minnesota, 1974

Helms, Carl Wilbert, *Head of Zoology Department; Professor of Zoology.* BA, University of Colorado, 1955; MA, 1956, PhD, 1960, Harvard University

Helms, Doris Reitinger, *Coordinator of Freshman Biology Program; Associate Professor of Biochemistry.* BS, Bucknell University, 1967; PhD, University of Georgia, 1973

Hendrix, William Herlie, *Associate Professor of Management.* BA, East Carolina University, 1962; MS, 1969, PhD, 1974, Purdue University

Henningson, Robert Walter, *Associate Director of University Research; Professor of Dairy Science.* BS, 1950, MS, 1952, PhD, 1956, Cornell University

Henricks, Donald Maurice, *Professor of Food Science and of Biochemistry.* BS, University of Missouri, 1957; MS, Purdue University, 1961; PhD, University of Missouri, 1965

Henry, Louis Lee, *Associate Professor of English.* BS, Clemson University, 1953; MA, 1958, PhD, 1965, Florida State University

Henry, Mark Scott, *Professor of Agricultural Economics and Rural Sociology.* BA, Baker University, 1968; PhD, Kansas State University, 1973

Heriot, Cathy Summers, *Adjunct Instructor in Nursing.* BSN, University of South Carolina, 1973; MS, Clemson University, 1979

Hester, Jarrett Charles, *Professor of Mechanical Engineering.* BS, Arlington State College, 1962; MS, 1964, PhD, 1966, Oklahoma State University

Heusinkveld, Paula Rae, *Assistant Professor of Spanish and French.* BA, Central College, 1968; MA, 1969, PhD, 1979, University of Wisconsin at Madison

Higgins, Julia Hill, *Assistant Professor of Nursing.* BSN, 1957; MN, 1971, Emory University

Hilderman, Richard Harold, *Associate Professor of Biochemistry.* BS, Jamestown College, 1966; PhD, University of Missouri, 1972; Post Doctorate, University of Connecticut, 1972-73

Hill, Hoke Smith, Jr., *Associate Professor of Experimental Statistics.* BS, The Citadel, 1971; MS, 1974, PhD, 1979, Clemson University

Hill, James Riley, Jr., *Resident Director of Edisto Experiment Station; Professor of Animal Science.* BS, 1956, MS, 1958, Clemson University; PhD, North Carolina State University, 1965

Hill, Robert White, *Associate Professor of English.* BA, 1963, MA, 1964, University of North Carolina; PhD, University of Illinois, 1972

Hipp, Earl Clay, Jr., *Assistant Professor of Marketing.* BA, Wofford College, 1968; MBA, 1972, JD, 1975, University of South Carolina

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Hochheimer, Laura, *Associate Professor of Music.* BME, Eastman School of Music, 1955; MFA, Ohio University, 1957; PhD, Indiana University, 1972

Hodges, Barbara Latimer, *State 4-H and Youth Development Coordinator; Assistant Professor of Home Economics.* BS, South Carolina State College, 1971; MEd, Clemson University, 1978

Hodges, Steven Clarke, *Assistant Professor of Agronomy and Soils.* BS, 1974, MS, 1977, University of Florida; PhD, Virginia Polytechnic Institute and State University, 1980

Hodgin, Jere Lee, *Assistant Professor of Drama.* BA, University of North Carolina, 1969; MFA, University of Georgia, 1973

Holbrook, Thomas Walton, *Adjunct Assistant Professor of Zoology.* BS, Georgia Southern College, 1967; MS, University of Georgia, 1969; PhD, Rutgers University, 1972

Holmes, Paul Thayer, *Professor of Mathematical Sciences.* BA, 1957, MA, 1959, Washington State University; PhD, Stanford University, 1966

Holschneider, Johannes Philipp, *Professor of Architecture.* Dipling, Technische Hochschule Karlsruhe, 1959; MArch, Massachusetts Institute of Technology, 1960; Dring, Technische Hochschule Aachen (Germany) 1969

Hood, Clarence Elam, Jr., *Professor of Agricultural Engineering.* BS, 1959, MS, 1961, PhD, 1964, North Carolina State University; PE

Hook, Donal Delose, *Professor of Forestry.* BS, 1961, MS, 1962, Utah State University; PhD, University of Georgia, 1968

Hooper, Robert Guy III, *Adjunct Associate Professor of Forest and Recreation Resources.* BS, Lynchburg College, 1965; MS, Virginia Polytechnic Institute and State University, 1967

Hope, Christine Ann, *Assistant Professor of Sociology.* BA, New College, 1970; MPhil, 1972, PhD, 1977, Yale University

Horton, Paul Mackey, *Assistant Professor of Entomology, Fisheries, and Wildlife.* BS, 1969, MS, 1973, Clemson University; PhD, Auburn University, 1981

Houston, Elizabeth Carol, *Assistant Professor of Home Economics.* BS, Limestone College, 1972; MS, Winthrop College, 1977

Howard, Gordon Edward, *Professor of Recreation and Park Administration.* BA, 1963, MA, 1964, University of North Carolina; PhD, University of Michigan, 1968

Howell, Nelda Kay, *Associate District Extension Leader; Associate Professor of Home Economics.* BS, East Carolina University, 1959; MEd, North Carolina State University, 1970

Howell, Richard Lynn, *Assistant Professor of Recreation and Park Administration.* BS, U.S. Air Force Academy, 1961; MURP, Virginia Commonwealth University, 1975

Hubbard, John William, *Professor of Agricultural Economics and Rural Sociology.* BS, Berea College, 1944; MS, 1958, PhD, 1962, University of Kentucky

Hubbard, Julius Clifford, Jr., *Alumni Professor of Textiles.* BS, Clemson University, 1942; MS, Georgia Institute of Technology, 1950

Hudson, Larry Wilson, *Professor of Animal Science.* BS, Berea College, 1964; MS, 1965, PhD, 1967, University of Kentucky

Hudson, Mark Richards, *Assistant Professor of Visual Arts.* BA, 1971, MFA, 1974, Clemson University

Hudson, William Garraux, *Associate Professor of Mechanical Engineering.* BME, 1946, MS, 1957, Clemson University; MS, University of Michigan, 1965; PE

Huey, Cecil Oates, Jr., *Associate Professor of Mechanical Engineering.* BS, 1965, MSME, 1968, PhD, 1973, Clemson University; PE

Huff, Georgia Lou, *Adjunct Assistant Professor of Medical Technology; Educational Coordinator, School of Medical Technology, Anderson Memorial Hospital.* BS, 1967, MEd, 1973, Clemson University

Huffman, John William, *Professor of Chemistry.* BS, Northwestern University, 1954; AM, 1956, PhD, 1957, Harvard University

Hughes, Buddy Lee, *Professor of Poultry Science.* BS, Clemson University, 1968; MS, 1970, PhD, 1971, Oregon State University

Hughes, Robbie Blankenship, *Instructor in Nursing.* BSN, Medical College of Georgia, 1967; MS, Clemson University, 1981

Hunt, Patrick Gatch, *Adjunct Associate Professor of Agronomy and Soils.* BS, 1965, MS, 1966, Clemson University; PhD, University of Florida, 1970

Hunter, Orren Franklin, Sr., *Assistant Professor of Textiles.* BS, Clemson University, 1961; MS, Institute of Textile Technology, 1963

Hunter, Robert Howard, *Professor of Visual Arts.* BS, 1951, MFA, 1953, University of Oregon

Hust, Carl Marlowe, *Adjunct Associate Professor of Recreation and Park Administration.* BS, Furman University, 1959

Hutton, Dale Jovan, *Visiting Professor of Architecture.* BArch, Texas A&M University, 1960; MSArch, Columbia University, 1961

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Idol, John Lane, Jr., *Professor of English.* BS, Appalachian State University, 1958; MA, 1961, PhD, 1965, University of Arkansas

Inge, Milton Thomas, *Head of English Department; Professor of English.* BA, Randolph-Macon College, 1959; MA, 1960, PhD, 1964, Vanderbilt University

Inge, Tonette Bond, *Visiting Assistant Professor of English.* BA, 1968, MA, 1972, Auburn University; PhD, Florida State University, 1975

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Irvine, David Lawrence, *Lecturer in Nursing.* BA, Virginia Polytechnic Institute and State University, 1972; MD, Medical College of Virginia, 1976

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Jackson, Herman Brown, Jr., *Head of Plant Pest Regulatory Service; Lecturer in Entomology, Fisheries, and Wildlife.* BS, Clemson University, 1964; MS, Auburn University, 1966; PhD, Oklahoma State University, 1971

Jackson, John Elwin, Jr., *Associate Professor of Mechanical Engineering and Engineering Mechanics.* BSAE, 1971, MS, 1973, PhD, 1977, University of Alabama; PE

Jacques, John David, *Associate Professor of Architecture.* BArch, Clemson University, 1970; MPhil, University of Edinburgh (Scotland), 1975; AIA

James, Ann Elizabeth, *Associate Professor of Recreation and Park Administration.* BS, Bowling Green State University, 1964; MS, University of North Carolina, 1971; PhD, University of New Mexico, 1978

James, Willie Romando, *State 4-H and Youth Development Coordinator; Associate Professor of Agricultural Education.* BS, Florida A&M University, 1960; MS, Jersey City State College, 1968

Jameson, Lake Hugh, *Associate Professor of Engineering Graphics.* BS, Clemson University, 1942; MS, North Carolina State University, 1952

Jamison, Robert Edward, *Associate Professor of Mathematical Sciences.* BS, Clemson University, 1970; MS, 1973, PhD, 1974, University of Washington

Jarvis, Christine Woodruff, *Associate Professor of Textiles.* BS, University of North Carolina, 1971; PhD, Massachusetts Institute of Technology, 1975

Jarvis, James Patrick, *Associate Professor of Mathematical Sciences.* BS, University of North Carolina, 1971; MS, 1973, PhD, 1975, Massachusetts Institute of Technology

Jeanes, Kathryn Rachel, *Visiting Assistant Professor of Nursing.* BSN, Emory University, 1969; MS, Boston University, 1970

Jenkins, Joyce Hrvol, *Associate Professor of Home Economics.* BS, Winthrop College, 1962; MEd, University of North Carolina, 1970

Jenkins, Robert Eugene, *Associate Professor of Education.* BS, Auburn University, 1949; MEd, Emory University, 1954; EdD, University of Florida, 1970

Jennett, Joseph Charles, *Dean, College of Engineering; Professor of Environmental Systems Engineering.* BS, 1963, MS, 1966, Southern Methodist University; PhD, University of New Mexico, 1969; PE

Jenny Bruce Frederick, *Associate Professor of Dairy Science.* BS, Delaware Valley College, 1968; MS, 1971, PhD, 1974, Virginia Polytechnic Institute and State University

Jensen, Arthur Kenneth, *Professor of Vocational and Technical Education.* BS, 1951, MS, 1956, PhD, 1961, University of Wisconsin

Jeyaraman, Ramasubbu, *Research Associate/Assistant Professor of Chemistry.* BS, 1966, MS, 1968, American College (India); PhD, Annamalai University (India), 1976

Johnson, Albert Wayne, *Professor of Entomology, Fisheries, and Wildlife, Pee Dee Experiment Station.* BS, 1966, MS, 1968, Clemson University; PhD, Auburn University, 1971

Johnson, John William, *Associate Professor of History.* BA, Saint Olaf College, 1968; MA, 1970, PhD, 1974, University of Minnesota

Johnston, Carol Elizabeth, *Visiting Assistant Professor of English.* BA. Rollins College, 1970; MA, University of Florida, 1972; PhD, University of South Carolina, 1980

Jones, Jack Edenfield, *Professor of Poultry Science.* BS, 1951, MS, 1964, PhD, 1968, University of Florida

Jones, Ulysses Simpson, *Professor of Agronomy and Soils.* BS, Virginia Polytechnic Institute, 1939; MS, Purdue University, 1942; PhD, University of Wisconsin, 1947

Jones, Walter Fleming, *Visiting Assistant Professor of Mechancial Engineering and Engineering Mechanics.* BS, 1978, MS, 1981, PhD, 1982, Clemson University

Jordan, Jewell Askew, *Associate Professor of Entomology, Fisheries, and Wildlife.* BS, Georgia State College for Women, 1953; MS, 1971, PhD, 1975, Clemson University

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Skove, Malcolm John, *Alumni Professor of Physics.* BS, Clemson University, 1956; PhD, University of Virginia, 1960

Slann, Martin Wayne, *Professor of Political Science.* AB, University of Miami, 1964; MA, University of Connecticut, 1966; PhD, University of Georgia, 1970

Smith, Alton Denny, *Instructor in Biology.* BS, Mississippi College, 1972; MS, East Texas State University, 1977

Smith, Benjamin Landis, *Assistant Professor of Industrial Education.* BS, Florida State University, 1966; MInEd, Clemson University, 1972

Smith, Bill Ross, *Associate Professor of Agronomy and Soils.* BS, Texas Tech University, 1964; MS, University of Arizona, 1966; PhD, North Carolina State University, 1970

Smith, Daniel Bruce, *Professor of Agricultural Economics and Rural Sociology.* BS, Auburn University, 1963; MS, University of Tennessee, 1965; PhD, University of Kentucky, 1973

Smith, David Cannon, *Assistant Professor of Entomology, Fisheries, and Wildlife.* BS, 1971, MS, 1974, Clemson University

Smith, Fred Harrison, *Professor of Plant Pathology and Physiology.* BSA, 1951, MSA, 1952, PhD, 1970, University of Georgia

Smith, Ivie Lee, *Adjunct Professor of Textiles.* BS, Georgia College, 1943; MS, Purdue University, 1946; PhD, Western Reserve University, 1952

Snell, Absalom West, *Associate Director of Agricultural Experiment Station; Professor of Agricultural Engineering.* BS, Clemson University, 1949; MS, Iowa State University, 1952; PhD, North Carolina State University, 1964; PE

Snelsire, Robert William,* *Associate Professor of Electrical and Computer Engineering.* BA, Bethany College, 1956; BS, 1956, MS, 1958, PhD, 1964, Carnegie Institute of Technology

Snipes, David Strange, *Professor of Geology.* BS, Wake Forest University, 1950; PhD, University of North Carolina, 1965

Snoddy, Patrick Douglas, *Lecturer in Computer Science.* BS, University of Southwestern Louisiana, 1971

Sorrenti, Patrick, *Assistant Professor of Aerospace Studies.* Capt., U.S. Air Force; BS, University of Maryland, 1977; MS, Troy State University, 1981

Spadoni, Rosemary Ann, *Assistant Professor of Nursing.* BSN, 1956, MSN, 1970, Russell Sage College

Sparks, David Lee, *Associate Professor of Marketing.* BBA, University of Miami, 1962; MBA, Florida State, 1963; PhD, University of Virginia, 1972

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*On leave

Sparks, Elisa Kay, *Assistant Professor of English.* BA, Bryn Mawr College, 1973; PhD, Indiana University, 1979

Sparks, Peter Robert, *Associate Professor of Civil Engineering and Engineering Mehcanics.* BS, University of Bristol (England), 1968; PhD, University of London, 1974

Spector, Myron, *Adjunct Professor of Bioengineering.* BS, 1967, MS, 1969, PhD, 1971, Carnegie-Mellon University; Post Doctorate, University of Pittsburgh, 1971

Spencer, Harold Garth, *Professor of Chemistry.* BSE, 1952, MS, 1958, PhD, 1959, University of Florida

Spitzer, John Carlisle, *Associate Professor of Animal Science.* BS, 1969, MS, 1974, PhD, 1975, Colorado State University

Spragins, John Diggs, *Professor of Electrical and Computer Engineering.* BSEE, Oklahoma State University, 1956; MS, 1958, PhD, 1964, Stanford University

Spray, Richard Allman, *Professor of Agricultural Engineering.* BS, 1966, MS, 1967, West Virginia University; PhD, University of Missouri, 1972

Stafford, Donald Bennett, *Associate Professor of Civil Engineering.* BS, 1961, MS, 1963, PhD, 1968, North Carolina State University; PE

Stage, Stephen Taylor, *Visiting Instructor in English.* BA, 1974, MA, 1982, San Diego State University

Stahl, Michael John, *Acting Head of Management Department; Professor of Management.* BS, State University of New York, 1969; MS, Air Force Institute of Technology, 1970; PhD, Rensselaer Polytechnic Institute, 1975

Stancil, Larry Bruce, *Assistant Professor of Military Science.* Maj., U.S. Army; BS, Clemson University, 1969; MA, Central Michigan University, 1979

Stanley, James Gordon, Jr., *Assistant Professor of Military Science.* Capt., U.S. Army; BS, Arkansas Polytechnic College, 1972

Stanley, Virginia Belcher, *Assistant Professor of Education.* BS, Winthrop College, 1965; MEd, Clemson University, 1971; EdD, University of South Carolina, 1979

Stanton, Judith Phillips, *Assistant Professor of English.* BA, Randolph-Macon Woman's College, 1968; MA, 1969, PhD, 1978, University of North Carolina

Stanton, Lynn Arthur, *Associate Professor of Agricultural Economics and Rural Sociology.* BS, 1959, MS, 1961, Cornell University; PhD, Louisiana State University, 1970

Steadman, Mark Sidney, Jr., *Professor of English and Writer in Residence.* AB, Emory University, 1951; MA, 1956, PhD, 1963, Florida State University

Steiner, Pinckney Alston, *Associate Professor of Physics.* BS, University of Georgia, 1959; PhD, Duke University, 1965; Post Doctorate, University of Copenhagen, 1964-66

Steirer, William Frank, Jr., *Associate Professor of History.* BA, Gettysburg College, 1959; MA, 1962, PhD, 1972, University of Pennsylvania

Stelling, Frank Henry III, *Adjunct Professor of Bioengineering.* BS, Augusta College, 1934; MD, Medical College of Georgia, 1938

Stevenson, Dennis Elliott, *Lecturer in Computer Science.* BA, Eastern Michigan University, 1965; MS, Rutgers University, 1975

Stevenson, John Lovett, *Professor of Recreation and Park Administration.* BS, Davidson College, 1952; BD, 1955, ThM, 1957, Union Theological Seminary; MA, 1967, PhD, 1968, Indiana University

Stewart, Harry Eugene, *Head of Languages Department; Professor of French.* BA, DePauw University, 1953; MA, 1956, PhD, 1961, Indiana University

Stillwell, Ephraim Posey, Jr., *Professor of Physics.* BS, Wake Forest University, 1956; MS, 1958, PhD, 1960, University of Virginia

Stillwell, Jean Glocker, *Lecturer in Geology.* BA, Gettysburg College, 1958

Stirn, Rita, *Adjunct Visiting Instructor in French.* Maitrise University of Clearmont-Ferrand, 1973; Licence, University of Strasbourg, 1977

Stockham, James Allen, *Assistant Professor of Visual Arts.* BFA, 1970, MFA, 1973, Wayne State University

Stone, Dewitt Boyd, *Coordinator, Clemson at Greenville TEC Program; Lecturer in Engineering.* BS, 1962, MS, 1964, University of Tennessee; PhD, Louisiana State University, 1969

Stone, Louis Howard, *Assistant Professor of Marketing.* BS, North Carolina State University, 1961; MBA, 1962, PhD, 1980, University of North Carolina

Stover, Ronald Grady, *Assistant Professor of Sociology.* BA, 1970, MA, 1973, PhD, 1975, University of Georgia

Strom, James Lee, *Director of Corporate Development; Lecturer in Management.* BS, Clemson University, 1965; BBA, Augusta College, 1970; PhD, Clemson University, 1975

Stroup, David James, *Assistant Professor of Biology.* BS, 1972, MS, 1975, PhD, 1980, University of Akron

Sturgis, Eugenie Ventre, *Instructor in Mathematical Sciences.* BS, 1945, MS, 1949, Louisiana State University

Sturkie, Douglas Kinly III, *Assistant Professor of Sociology.* BA, Newberry College, 1970; MSW, University of South Carolina, 1973; DSW, University of Southern California, 1979

Stutzenberger, Fred John, *Professor of Microbiology.* BS, Bellarmine-Ursuline College, 1962; MS, University of Houston, 1964; PhD, Michigan State University, 1967

Suarez, Eva Luisa, *Instructor in Experimental Statistics.* BS, University of Puerto Rico, 1974; MS, Clemson University, 1980

Sullivan, John Russell, *Associate Professor of Mathematical Sciences.* AB, 1939, MA, 1949, Georgetown University

Sullivan, Michael Jack, *Associate Professor of Entomology, Fisheries, and Wildlife, Edisto Experiment Station.* BS, Texas Tech University, 1967; MS, 1971, PhD, 1973, North Carolina State University

Sumichrast, Robert Thomas, *Lecturer in Management.* BS, Purdue University, 1979

Surver, William Merle, *Associate Professor of Biology.* BS, St. Francis College, 1966; PhD, University of Notre Dame, 1974

Sutherland, Richard Henry, *Assistant Professor of Aerospace Studies.* Maj., U.S. Air Force; BS, Clemson University, 1971; MS, Webster College, 1980

Sutton, Russell Wayne, *Associate Professor of Agricultural Economics and Rural Sociology.* BS, 1963, MS, 1967, PhD, 1974, University of Kentucky

Swanson, David Mitchell, *Associate Professor of Management and Economics.* BS, University of North Carolina, 1966; MA, University of Chicago, 1969; PhD, University of North Carolina, 1972

Sweeney, John Robert, *Associate Professor of Entomology, Fisheries, and Wildlife.* BS, 1967, MS, 1971, University of Georgia; PhD, Colorado State University, 1975

Sweeny, Thomas Estes, *Assistant Professor of Agricultural Economics and Rural Sociology.* BA, Knox College, 1969; MA, University of Rhode Island, 1981

Swicegood, Myrle Lutterloh, *State Leader, Extension Home Economics Programs; Professor of Home Economics.* BS, University of North Carolina, 1944; MS, North Carolina State University, 1965; PhD, University of North Carolina, 1974

Tainter, Franklin Hugh, *Associate Professor of Forestry.* BSF, University of Montana, 1964; MS, 1968, PhD, 1970, University of Minnesota

Talton, James Ralph, Jr., *Adjunct Professor of Accounting.* BS, East Carolina University, 1965

Tanner, Gloria Ann, *Director of Nursing Research; Professor of Nursing.* BSN, Mount Saint Agnes College, 1956; MSN, University of Maryland, 1964; EdD, Columbia University Teachers College, 1974

Taras, Michael Andrew, *Head of Forestry Department; Professor of Forestry.* BS, 1942, MF, 1948, Pennsylvania State University; PhD, North Carolina State University, 1965

Taylor, Robert Joe, *Associate Professor of Zoology.* BA, Stanford University, 1967; MA, 1970, PhD, 1972, University of California

Taylor, Theodore David, *Associate Professor of Ceramic Engineering.* BS, Alfred University, 1963; MS, 1966, PhD, 1971, Pennsylvania State University

Tergliafera, Gloria Williamson, *Visiting Instructor in Food Science.* BS, Northeast Louisiana University, 1974; MS, Louisiana Tech University, 1976

Thacher, John Edmund, *Visiting Instructor in Animal Science.* BA, 1971, MS, 1974, University of Wisconsin

Thames, Brenda Jumper, *Instructor in Home Economics.* BS, Mississippi State University, 1976

Thomas, Everett Lane, Jr., *Professor of Systems Engineering.* BS, 1961, MS, 1968, PhD, 1972, Oklahoma State University

Thomas, Henry Albert, *Lecturer in Recreation and Park Administration.* BS, High Point College, 1975; MS, University of North Carolina, 1978

Thompson, Carl Eugene, *Professor of Animal Science.* BS, 1963, MS, 1968, Pennsylvania State University; PhD, Virginia Polytechnic Institute and State University, 1971

Thompson, Carl Stassen, *Professor of Agricultural Economics and Rural Sociology.* BS, MS, 1968, Murray State University; PhD, University of Kentucky, 1973

Thompson, Gerald Richard, *Assistant Dean, College of Commerce and Industry; Professor of Economics.* BA, University of South Florida, 1966; PhD, University of Virginia, 1972

Thompson, Regina, *Assistant Professor of Nursing.* BS, Bluefield State College, 1951; MA, Columbia University, 1958

Thompson, Sharon Wolff, *Assistant Professor of Nursing.* BSN, Murray State University, 1968; MSN, University of Kentucky, 1972

Thurmond, James Strom, *Adjunct Professor of Political Science.* BS, Clemson University, 1923

Thurmond, Nancy Moore, *Adjunct Professor of Nursing.* BA, University of South Carolina, 1968

Thurston, James Norton, *Visiting Professor of Electrical and Computer Engineering.* BEE, Ohio State University, 1936; SM, 1943, ScD, 1950, Massachusetts Institute of Technology; PE

Thurston, Ronald James, *Associate Professor of Poultry Science.* BA, 1966, MS, 1969, University of Arkansas; PhD, University of Missouri, 1976

Tillinghast, David Charles,* *Assistant Professor of English.* BA, Louisiana Tech University, 1961; MA, University of Wisconsin, 1963; PhD, University of South Carolina, 1974

Tilly, Laurence John, *Adjunct Associate Professor of Botany.* BS, Elmhurst College, 1952; MS, University of Illinois, 1953; PhD, Iowa State University, 1965

Tinsley, William Allan, *Professor of Agricultural Economics and Rural Sociology.* BS, 1956, MS, 1960, University of Illinois; PhD, University of Minnesota, 1963

Tisue, Thomas G, *Associate Professor of Chemistry.* BS, Beloit College, 1961; PhD, Yale University, 1966

Titus, Sylvia Smith, *Instructor in English.* BA, Southwestern State College, 1968; MA, Oklahoma State University, 1970

Titus, Terry Charles, *Professor of Food Science.* BS, Washington State University, 1963; MS, 1969, PhD, 1970, Oklahoma State University

Todd, Boyd Joseph, *Professor of Management and Mathematical Sciences.* BS, 1946, MS, 1948, Clemson University; PhD, North Carolina State University, 1969

Toler, Joe Ernest, *Instructor in Experimental Statistics.* BS, 1966, MSA, 1968, University of Georgia

Torrence, Alan Kendrick, *Head of Agricultural Chemical Services Department; Lecturer in Food Science.* BS, Davidson College, 1965; PhD, Clemson University, 1971

Trent, Buford Earl, *Director of University Union and YMCA; Associate Professor of Recreation and Park Administration.* BA, Wofford College, 1956; MEd, Springfield College, 1961

Trevillian, Wallace Dabney, *Professor of Economics.* BS, 1940, MA, 1947, PhD, 1954, University of Virginia

Trikosko, Walter Lawrence, *Lecturer in Physics.* BA, University of Tennessee, 1972; MS, Memphis State University, 1975

Turk, Donald Earle, *Professor of Food Science.* BS, 1953, MNS, 1957, Cornell University; PhD, University of Wisconsin, 1960

Turner, Albert Joseph, Jr., *Head of Computer Science Department; Associate Professor of Computer Science.* BS, 1961, MS, 1966, Georgia Institute of Technology; MS, 1972, PhD, 1976, University of Maryland

Turner, James Alexander, Jr.,* *Professor of Accounting.* BS, University of North Carolina, 1961; JD, University of South Carolina, 1966; CPA

Turner, Raymond Clyde, *Associate Professor of Physics.* BS, Carnegie Institute of Technology, 1960; PhD, University of Pittsburgh, 1966

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*On leave

Turnipseed, Samuel Guy, *Professor of Entomology, Fisheries, and Wildlife, Edisto Experiment Station.* BA, University of North Carolina, 1956; MS, Clemson University, 1958; PhD, North Carolina State University, 1961

Uhimchuck, George Alex, *Assistant Professor of Economics.* BS, State University of New York, 1975; MS, 1977, PhD, 1980, Virginia Polytechnic Institute and State University

Ulbrich, Carlton Wilbur, *Professor of Physics.* BS, 1960, MS, 1962, PhD, 1965, University of Connecticut

Ulbrich, Holley Hewitt, *Professor of Economics.* BA, 1963, MA, 1964, PhD, 1968, University of Connecticut

Underwood, Richard Allan, *Associate Professor of English.* BA, 1955, MA, 1967, PhD, 1970, University of Michigan

Usrey, Malcolm Orthell, *Associate Professor of English.* BA, Abilene Christian College, 1951; MA, 1956, PhD, 1963, Texas Tech University

Van Lear, David Hyde, *Robert Adger Bowen Professor of Forestry.* BS, 1963, MS, 1965, Virginia Polytechnic Institute; PhD, University of Idaho, 1969; Post Doctorate, University of Florida, 1968-69

Varenhorst, Glenn Elmer, *Associate Professor of Planning Studies.* BA, 1949, MPA, 1952, University of Kansas; MS, University of Wisconsin, 1965; AIP

Vatalaro, Michael Vincent, *Assistant Professor of Visual Arts.* BFA, University of Akron, 1972; MFA, Alfred University, 1976

Vaughn, Edward Allen, *Director of School of Textiles; Professor of Textiles.* BS, Lynchburg College, 1962; MS, Institute of Textile Technology, 1964; PhD, Victoria University of Manchester (England), 1969

Vijay, James, *Visiting Assistant Professor of Mathematical Sciences.* MS, Indian Institute of Technology, 1972; PhD, Johns Hopkins University, 1976

Vines, Dwight Theodore, *Associate Professor of Dairy Science.* BS, 1968, MS, 1972, University of Arkansas; PhD, Michigan State University, 1976

Voelker, Evelyn Cecilia, *Associate Professor of Architectural History.* BA, Marymount College, 1958; MA, Catholic University, 1960; PhD, Syracuse University, 1977

Vogel, Henry Elliott, *Dean, College of Sciences; Professor of Physics.* BS, Furman University, 1948; MS, 1950, PhD, 1962, University of North Carolina

Von Recum, Andreas Freiherr, *Professor of Bioengineering.* BS, University of Giessen (Germany), 1965; DVM, Free University of Berlin, 1969; PhD, Colorado State University, 1974

Von Rosenberg, Joseph Leslie, Jr., *Professor of Chemistry.* BA, 1954, PhD, 1963, University of Texas

Von Tungeln, George Robert, *Assistant to the Dean-International Programs; Coordinator of Special Instructional Programs, College of Agricultural Sciences; Professor of Agricultural Economics and Rural Sociology.* BS, 1951, MS, 1956, Southern Illinois University; PhD, University of Georgia, 1974

Waddle, Gerald Lee, *Acting Head of Marketing Department; Associate Professor of Marketing.* BA, Baldwin-Wallace College, 1965; MBA, Kent State University, 1968; PhD, University of South Carolina, 1973

Wagner, Charles Kenyon, *Associate Professor of Biology.* BA, Emory University, 1965; MS, 1968, PhD, 1973, University of Georgia

Wagner, Donald Finch, *Associate Professor of Horticulture.* BS, 1963, MS, 1965, PhD, 1968, Iowa State University

Wagner, John Robert, *Instructor in Geology.* BS, Muhlenberg College, 1970; MEd, 1972, MA, 1976, Temple University

Waide, Jack Boid, *Instructor in Zoology.* BA, University of Texas, 1970

Wainscott, Stephen Henry, *Assistant Professor of Political Science.* BA, St. Andrews Presbyterian College, 1967; MA, 1972, PhD, 1976, Miami University

Walker, Gerald Lee, *Associate Professor of Architecture.* BArch, Clemson University, 1966; MCP, University of Pennsylvania, 1969

Walker, John Henry, *Associate Professor of Education.* BS, Southwest Missouri State College, 1959; MRE, 1962, DRE, 1966, Southwestern Baptist Theological Seminary; MA, Furman University, 1969; PhD, University of Texas, 1973

Walker, Walter Saxon, *Professor of Poultry Science.* BS, Clemson University, 1951; MEd, University of South Carolina, 1957

Wallace, Myles Stuart, *Associate Professor of Economics.* BA, 1968, MA, 1974, PhD, 1976, University of Colorado

Wallace, Susan Ulmer, *Assistant Professor of Agronomy and Soils.* BS, 1973, MS, 1975, University of Alabama; PhD, Iowa State University, 1979

Wallenius, Kenneth Ted,* *Professor of Mathematical Sciences.* AB, 1954, MA, 1955, University of Southern California; PhD, Stanford University, 1964

Waller, Robert Alfred, *Dean, College of Liberal Arts; Professor of History.* BA, Lake Forest College, 1953; MA, 1958, PhD, 1963, University of Illinois

Wang, Leonard Fong-Sheng, *Assistant Professor of Economics.* BA, 1971, MA, 1973, Soochow University; MS, 1977, PhD, 1980, Purdue University

Wang, Samuel, *Professor of Visual Arts.* BA, Augustana College, 1964; MFA, University of Iowa, 1966

Wannamaker, John Murray, *Professor of Accounting.* BS, 1950, MS, 1960, University of South Carolina; PhD, Louisiana State University, 1966; CPA, CMA

Wannamaker, Patricia Walker, *Associate Professor of German.* AB, 1950, MA, 1958, University of South Carolina; PhD, Louisiana State University, 1964

Ward, Carol Marie, *Assistant Professor of English.* BA, 1973, MA, 1976, University of South Carolina; PhD, University of Tennessee, 1981

Ward, Jeanne Ellen, *Adjunct Associate Professor of Nursing.* BS, St. Joseph's College, 1982

Warner, Daniel Douglas, *Associate Professor of Mathematical Sciences.* BS, 1965, MA, 1966, Arizona State University; PhD, University of California, 1974

Warner, John Terry, *Associate Professor of Economics.* BA, Wake Forest University, 1969; ME, 1972, PhD, 1976, North Carolina State University

Warner, Richard Dudley, *Assistant Professor of Geology.* BS, Massachusetts Institute of Technology, 1966; PhD, Stanford University, 1971

Watkins, George Leon III, *Instructor in Agricultural Economics and Rural Sociology.* BS, 1969, MAg, 1977, Clemson University

Watson, Katherine Ramsey, *Instructor in Mathematical Sciences.* BA, William and Mary College, 1938; MMath, University of South Carolina, 1965

Webb, Byron Kenneth, *Head of Agricultural Engineering Department; Professor of Agricultural Engineering.* BS, 1955, MS, 1962, Clemson University; PhD, North Carolina State University, 1966; PE

Webb, Hugh Weyman, *Professor of Building Science.* BCE, Clemson University, 1941; MS, Stanford University, 1957; PE

Webb, Lloyd George, *Visiting Professor of Entomology, Fisheries, and Wildlife.* BS, University of Georgia, 1938; MS, Auburn University, 1941; PhD, Ohio State University, 1949

Webster, Henry Wise, *Professor of Animal Science.* BS, 1960, MS, 1974, North Carolina State University; PhD, Clemson University, 1976

Wells, Gary James, *Associate Professor of Agricultural Economics and Rural Sociology.* BA, University of North Carolina, 1973; ME, 1974, PhD, 1977, North Carolina State University

Welter, John Finlay, *Associate Professor of Poultry Science.* BS, 1951, MS, 1964, Clemson University

Wentworth, William Martin, *Assistant Professor of Sociology.* BA, Indiana University, 1972; MA, University of Maryland, 1974; PhD, University of Virginia, 1978

West, William Elmer, *Professor of Industrial Education.* BS, Ohio University, 1958; MA, 1964, PhD, 1969, Ohio State University

Westall, James Mason, Jr., *Associate Professor of Computer Science.* BS, Davidson College, 1968; PhD, University of North Carolina, 1973

Wheeler, Alan Dexter, *Instructor in Management.* BBA, University of Massachusetts, 1950; MBA, West Texas State University, 1969

*On leave

Wheeler, Alfred Portius, *Associate Professor of Zoology.* BS, Butler University, 1969; PhD, Duke University, 1975

Whetstone, Jack Moorer, Jr., *Instructor in Entomology, Fisheries, and Wildlife.* BS, 1975, MS, 1978, Clemson University

White, Charlie Raymond, Jr., *Associate Professor of Recreation and Park Administration.* BS, North Carolina State University, 1966; MS, Indiana University, 1967

White, Max Edgar, *Assistant Professor of Anthropology.* BA, 1968, MA, 1970, University of Georgia; PhD, Indiana University, 1980

White, Mervin Forrest, *Associate Professor of Sociology.* BS, 1962, MS, 1965, Brigham Young University; PhD, University of Kentucky, 1971

Whitehurst, Clinton Howard, Jr., *Professor of Management and Economics.* BS, 1957, MA, 1958, Florida State University; PhD, University of Virginia, 1962; Post Doctorate, Edinburgh University, 1970

Whitmire, Jerry Morris, *Assistant Professor of Spanish.* BA, University of North Carolina, 1963; MA, University of Alabama, 1966

Whitten, William Clyde, Jr., *Professor of Economics.* BS, Clemson University, 1947; MS, Georgia Institute of Technology, 1950; PhD, University of Alabama, 1964

Wickliffe, Louise Waldrop, *Instructor in Nursing.* BSN, University of South Carolina, 1975; MSN, Medical College of Georgia, 1978

Wiggins, Charles Donald, *Associate Professor of Finance.* BBA, 1972, MBA, 1973, Georgia Southern College; DBA, Louisiana Tech University, 1976; CPA

Wiggins, Emily Sutherland, *Assistant Professor of Home Economics.* BS, 1959, MAT, 1969, Winthrop College

Wilhite, Mary Jean, *Director of Baccalaureate Degree Program in Nursing; Associate Professor of Nursing.* BSN, Baylor University, 1958; MSN, Washington University (St. Louis), 1968; EdD, University of Tulsa, 1975

Willey, Edward Parker, *Associate Professor of English.* AB, 1955, MA, 1957, PhD, 1968, University of North Carolina

Williams, John Newton II, *Professor of Animal Science.* BS, Alabama Polytechnic Institute, 1950; MS, Mississippi State University, 1961; PhD, University of Tennessee, 1965

Williams, Thomas Michael, *Assistant Professor of Forestry, Belle W. Baruch Forest Science Institute.* BS, 1969, MS, 1971, PhD, 1976, University of Minnesota

Williams, Woodie Prentiss, Jr., *Head of Food Science Department; Professor of Food Science.* BS, 1953, MS, 1957, Mississippi State University; PhD, Texas A&M University, 1960

Williamson, Robert Douglas, *Adjunct Associate Professor of Forest and Recreation Resources.* BS, 1971, MS, 1973, Howard University; PhD, University of Massachusetts, 1978

Williamson, Robert Elmore, *Professor of Agricultural Engineering.* BS, 1959, MS, 1964, Clemson University; PhD, Mississippi State University, 1972; PE

Willingham, Russell, *Instructor in French.* BA, Clark College, 1963; MA, Atlanta University, 1967

Willis, Naomi Honeycutt, *Instructor in Home Economics.* BS, Mars Hill College, 1964

Wilson, Lawrence Allen, *Research Associate/Assistant Professor of Zoology.* BS, Emory University, 1975; MS, Clemson University, 1978

Wilson, Thomas Virgil, *Alumni Professor of Agricultural Engineering.* BS, Clemson University, 1942; MS, Purdue University, 1949; PhD, North Carolina State University, 1972; PE

Witcher, Wesley, *Professor of Plant Pathology and Physiology.* BS, 1949, MS, 1958, Virginia Polytechnic Institute; PhD, North Carolina State University, 1960

Witherspoon, Gayland Brooks, *Professor of Architecture.* BArch, University of Arkansas, 1956; MSArch, University of Illinois, 1962; AIA

Wolak, Francis John, *Assistant Professor of Agricultural Engineering.* BS, 1976, PhD, 1979, Michigan State University

Wolf, Dan, *Adjunct Professor of Agricultural Engineering.* BS, 1958, MS, 1960, DSc, 1970, Technion, Israel Institute of Technology

Wolf, James Steven, *Professor of Materials Engineering.* BS, 1954, MS, 1960, Case Institute of Technology; PhD, University of Florida, 1965; PE

Wolla, Maurice LeRoy, *Professor of Electrical and Computer Engineering.* BS, North Dakota State University, 1956; PhD, Michigan State University, 1966

Womer, Norman Keith, *Professor of Management and Economics.* BA, Miami University, 1966; PhD, Pennsylvania State University, 1970

Wood, Gene Wayne, *Professor of Forestry, Belle W. Baruch Forest Science Institute.* BS, Virginia Polytechnic Institute and State University, 1963; MS, 1966, PhD, 1971, Pennsylvania State University

Woodell, Charles Harold, *Associate Professor of English.* BA, 1963, MA, 1964, Wake Forest University; PhD, University of North Carolina, 1974

Woodruff, James Raymond, *Professor of Agronomy and Soils.* BS, 1958, MS, 1964, North Carolina State University; PhD, Clemson University, 1967

Woods, Sam Gray, *Instructor in Animal Science.* BS, Clemson University, 1952

Woodside, Ben Perry III, *Associate Professor of Finance.* BA, Furman University, 1968; MBA, 1970, PhD, 1978, University of South Carolina

Woodson, Marvin Clarence, Jr., *Associate Professor of Education.* BS, Furman University, 1961; MAT, Converse College, 1964; PhD, University of South Carolina, 1976

Wooten, Thomas Ernest, *Alumni Professor of Forestry.* BA, Catawba College, 1962; MF, Duke University, 1965; PhD, North Carolina State University, 1967

Wortman, Martin Alan, *Assistant Professor of Electrical and Computer Engineering.* BS, 1977, MS, 1979, North Carolina State University; PhD, Virginia Polytechnic Institute and State University, 1982

Wourms, John Barton, *Professor of Zoology.* BS, 1958, MS, 1960, Fordham University; PhD, Stanford University, 1966

Wright, John Cushing, *Visiting Assistant Professor of Psychology.* BA, Wittenberg University, 1970; MA, 1972, PhD, 1976, Miami University

Wright, Robert Eugene, *Professor of Animal Pathology.* DVM, University of Georgia, 1956

Wynn, Eddie Dowell, *Associate Professor of Agricultural Economics and Rural Sociology.* BA, Howard University, 1971; MCRP, Clemson University, 1974

Wynn, Mable Hill, *Assistant Professor of Recreation and Park Administration.* BS, Hampton Institute, 1964; MS, Springfield College, 1971

Yandle, Thomas Bruce, Jr.,* *Professor of Economics.* AB, Mercer University, 1955; MBA, 1968, PhD, 1970, Georgia State University

Yang, Tah-Teh, *Professor of Mechanical Engineering.* BS, Shanghai Institute of Technology, 1948; MS, Oklahoma State University, 1957; PhD, Cornell University, 1961

Yardley, Darrell Gene, *Associate Professor of Zoology.* BA, 1971, MA, 1972, University of Texas; PhD, University of Georgia, 1975

Young, Joseph Laurie, *Professor of Architecture.* BArch, University of Texas, 1950; MArch, Georgia Institute of Technology, 1955; AIA; FAIA

Zabrucky, Karen Michele, *Visiting Assistant Professor of Psychology.* BA, Kent State University, 1973; MA, 1977, PhD, 1980, University of Toledo

Zahner, Robert, *Professor of Forestry.* BS, 1949, MF, 1950, PhD, 1953, Duke University

Zehr, Eldron Irvin, *Professor of Plant Pathology and Physiology.* BA, Goshen College, 1960; MS, 1965, PhD, 1969, Cornell University

Zielinski, Paul Bernard, *Chairman of Directorate of Water Resources Research Institute; Professor of Civil Engineering.* BSCE, Marquette University, 1956; MS, 1961, PhD, 1965, University of Wisconsin; PE

Zimmerer, Thomas William, *Professor of Management.* BA, BS, American University, 1963; MS, Louisiana State University, 1964; PhD, University of Arkansas, 1971

Zimmerman, James Kenneth, *Acting Head of Biochemistry Department; Associate Professor of Biochemistry.* BS, University of Nebraska, 1965; PhD, Northwestern University, 1969

Zimmerman, Marc James, *Research Associate/Assistant Professor of Zoology.* BA, Case Western University, 1969; PhD, University of Georgia, 1980

Zublena, Joseph Peter, *Assistant Professor of Agronomy and Soils.* BS, 1973, MS, 1977, PhD, 1979, Rutgers University

Zungoli, Patricia Ann, *Assistant Professor of Entomology, Fisheries, and Wildlife.* BS, 1974, MS, 1979, University of Maryland

*On leave

EMERITI FACULTY

Adams, Hewitt Dayne, BS, MA, *Professor of Emeritus of History*

Albert, Willard Benjamin, BS, MS, PhD, *Professor Emeritus of Botany and Bacteriology*

Allen, Leonard Ray, BS, MS, PhD, *Professor Emeritus of Agronomy and Soils*

Armstrong, George Miller, BS, MA, PhD, *Head Emeritus of Botany and Bacteriology Department; Professor Emeritus of Botany and Bacteriology; Plant Pathologist Emeritus*

Arndt, Charles Homer, AB, MS, PhD, *Plant Pathologist Emeritus*

Aull, George Hubert, BS, MS, PhD, *Head Emeritus of Agricultural Economics and Rural Sociology Department; Professor Emeritus of Agricultural Economics and Rural Sociology; Agricultural Economist Emeritus*

Baker, George Homer, BS, *State Coordinator Emeritus of 4-H and Youth Development Programs; Professor Emeritus of Agronomy and Soils*

Balk, William Armstrong, BS, MS, *Professor Emeritus of Agricultural Engineering, Edisto Experiment Station*

Banister, Robert Allen, BS, MS, *Director Emeritus of Cooperative Education; Professor Emeritus of Engineering Graphics*

Barker, William Jefferson, BS, *Professor Emeritus of Forestry*

Barnhill, James Wallace, BA, MA, *Professor Emeritus of History*

Bauknight, Lehman M., Jr., BS, MS, *Professor Emeritus of Agricultural Economics and Rural Sociology*

Benton, Don Alwin, BS, *Professor Emeritus of Agronomy and Soils*

Bierer, Bert W., DVM, *Professor Emeritus of Poultry Science*

Bolen, Claude Waldron, AB, MA, PhD, *Professor Emeritus of History*

Boone, Merritt Anderson, BS, MS, PhD, *Professor Emeritus of Poultry Science*

Bosdell, Francis Alvin, BS, MInEd, *Professor Emeritus of Industrial Education*

Bowen, William Clayton, BS, MS, *Professor Emeritus of Agricultural Education*

Bragg, Mary Emerson, BLS, *Librarian Emerita, Cataloger*

Brandt, Graydon William, BS, MS, PhD, *Professor Emeritus of Dairy Science*

Brannon, Carroll Cleveland, BS, *Professor Emeritus of Dairy Science*

Brown, Hugh Monroe, BA, MA, PhD, *Dean Emeritus, School of Textiles*

Bruner, Marlin Harner, BS, MF, *Professor Emeritus of Forestry; Forest Manager Emeritus, The Clemson Forest*

Buchanan, Patricia Hill, AB, AM, PhD, *Professor Emerita of History*

Burch, Thomas Augustus, BS, MS, *Professor Emeritus of Agricultural Economics and Rural Sociology*

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John H. Timmerman, '62, Chapin, South Carolina
Robert P. Timmerman, '41, Aiken, South Carolina
Robert H. Yeargin, '49, Greenville, South Carolina

Administration of Student Affairs

Walter T. Cox, BS, *Vice President for Student Affairs and Dean of Students*
Manning N. Lomax, BS, *Assistant Vice President for Student Affairs*
Bobby J. Skelton, PhD, *Assistant Vice President for Student Affairs and Dean of Admissions and Registration*
Walter A. Mayfield, MEd, *Systems Analyst*

ADMISSIONS AND REGISTRATION

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Alice H. Allen, MEd, *Publications Editor*
David B. Fleming, BS, *Schedule Coordinator*
Otis D. Nelson, MA, *Director, International Services*

ADMISSIONS

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T. Frank Gentry, MEd, *Associate Director*
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Deborah G. Ervin, BA, *Admissions Counselor*
Allison B. Harris, BA, *Assistant Director*
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Joseph J. Turner, MS, *Executive Secretary, IPTAY*
James B. McFadden, BS, *Director, Intramural Activities*
Robert C. Bradley, BS, *Director, Sports Information*
Billy H. Wilhelm, BA, *Head Coach, Baseball*
William C. Foster, MS, *Head Coach, Basketball*
Annie S. Tribble, MEd, *Head Coach, Women's Basketball; Associate Director, Intramurals*
Sam L. Colson, MEd, *Head Coach, Men's and Women's Cross Country and Track*
Danny L. Ford, MA, *Head Coach, Football*
Robert W. Robinson, BS, *Associate Director; Head Coach, Golf*
Ibrahim M. Ibrahim, PhD, *Head Coach Soccer*
George R. Boettner, MS, *Head Coach, Men's and Women's Swimming*
Charles P. Kriese, BS, *Head Coach, Tennis*
Andrew Johnston, BS, *Head Coach, Women's Tennis*
Margaret Wessel, BA, *Head Coach, Women's Volleyball*
S. Wade Schalles, MS, *Head Coach, Wrestling*

BOOKSTORE
John C. Cureton, *Manager*

CAREER SERVICES
Alfred Mathiasen, Jr., MS, *Director*
Edwin F. Rumsey, MS, *Director, Cooperative Education*
Marty H. Williams, MEd, *Cooperative Education Coordinator*

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Barbara M. Foltz, MA, *Counselor*
Galen H. Steele, PhD, *Psychologist*
Michael L. Vinson, PhD, *Psychologist*

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Miriam G. Wilson, BA, *Counselor*

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John W. Young, Jr., BS, *Associate Director*
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Cynthia M. Cooley, BS, *Assignments and Records Coordinator*
Verna G. Howell, MEd, *Assistant Director*
William L. Kincaid, MS, *Assistant Director*
Matthew J. Watkins, MEd, *Area Coordinator*
Robin L. Wicker, BA, *Area Coordinator*

LITTLEJOHN COLISEUM
George L. Jones, *Manager; Groundskeeping Supervisor*

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John H. Butler, EdD, *Director, Music Activities and Manager of Concert Series*
Willard C. Cottrell, MA, *Director, Choral Activities*
Bruce F. Cook, DMA, *Director, Bands*
Richard E. Goodstein, MM, *Assistant Director, Bands*

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Stanley B. Smith, Jr., MA, *Registrar*
Frances H. Blair, BA, *Assistant Registrar*
Jerry A. Jordan, *Operations Manager*
Judith A. Ray, *Recorder*

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John D. Davenport, PhD, *Psychologist*
Byron B. Harder, MD, *Physician*
Sandra C. Smith, RN, *Director, Nurses*
James S. Ulmer, MD, *Physician*

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Kirk A. Brague, MEd, *Associate Dean*

Frank A. Burtner, PhD, *Director, Fraternity Affairs*
John W. Pace, MEd, *Assistant Dean*
L. Teresa Paschal, MEd, *Assistant Dean*

UNIVERSITY UNION

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Ina B. Durham, BS, *Director, Information Center*
Edie P. Furman, BA, *Assistant Director, Programs*
Andrew B. Harris, BS, *Director, Operations*
William Mandicott, MEd, *Director, Programs*
Walter K. Wilcox, Jr., BS, *Night Supervisor*
Sarah S. Williamson, BS, *Director, Business*

PUBLIC SERVICE ACTIVITY

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Office of Educational Services

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Dudley W. Blair, PhD
Lloyd H. Blanton, PhD
Edwin T. Boyer, EdD
Ida C. Briscoe, EdD
A. DeWayne Brooks, EdD
Sam L. Buckner, EdD
B. Verner Burkett, PhD
Paul C. Caley, PhD
Spurgeon N. Cole, PhD
William O. Corder, EdD
Margaree S. Crosby, EdD
James H. Daniels, EdD
David A. Dumont, PhD
James L. Flatt, PhD
Elizabeth B. Galloway, EdD
Gordon W. Gray, EdD
John V. Hamby, PhD
Lillian B. Hart, EdD
J. Alex Hash, EdD
Clinton H. Isbell, EdD
Robert E. Jenkins, EdD
Don F. Keller, EdD
Donald R. LaTorre, PhD
John K. Leudeman, PhD
Gerald G. Lovedahl, PhD
Oliver R. Lumpkin, PhD
John W. McAlhany, PhD
James E. Matthews, EdD
Robert J. Mercer, EdD
Michael G. Moran, PhD
Alfred F. Newton, EdD
Edward F. Olive, EdD
Thomas H. Parry, EdD
William W. Pennscott, EdD
Frederick T. Raetsch, PhD
John C. Richardson, EdD
Bruce L. Sandberg, PhD
Charles D. Schmittou, EdS
Roxanne A. Smith, MS
Virginia B. Stanley, EdD
George A. Uhimchuck, PhD
John H. Walker, PhD
William E. West, PhD
Marvin C. Woodson, PhD
H. Floyd Wright, EdD

The College of Education offered off-campus courses through the Office of Educational Services for school districts and other agencies in South Carolina. The following is an official record of the courses offered from the spring semester through the fall semester 1982.

ABBEVILLE		
Spring	ED 794	School and Community Relationships
Summer	ED 801	Seminar in Human Growth and Development
Fall	ED 864	Special Problems in Reading Education
ANDERSON		
Spring	ED 634	Teaching Writing*
Summer	ECON 750	Economic Concepts and Classroom Applications for Teachers
	INED 410, 610	Advanced Arts and Crafts*
Fall	ED 634	Psychology of the Disadvantaged*
	ENGL 801	Topics in Composition and Rhetoric
	INED 496, 696	Public Relations
CHESTER		
Fall	INED 410, 610	Student Organization*
COLUMBIA		
Spring	AGED 736	Internship: Teaching
Summer	INED 410, 610	Legal and Legislative Aspects of Vocational Education*
Fall	AGED 450, 650	Modern Topics and Issues

FLORENCE

Spring	AGED 869	Seminar
	INED 310	Methods of Trade Teaching
	INED 451	Special Projects
	INED 452, 652	Advanced Projects
Fall	AGED 450, 650	Modern Topics and Issues
	INED 310	Methods of Trade Teaching

GAFFNEY

Fall	INED 410, 610	Student Organizations
	INED 451	Special Projects
	INED 452, 652	Advanced Projects

GREENVILLE

Spring	ECON 751	Current Issues in Economics for Teachers
	ED 635	Middle School Organization and Curriculum*
	ED 705	Principles of Guidance
	ED 721	Legal Phases of School Administration
	ED 794	School and Community Relationships
	ED 801	Seminar in Human Growth and Development
	ED 802	Human Development: Psychology of Learning
	INED 410, 610	Contemporary Issues in Industrial Education*
	INED 410, 610	Preparation of Instructional Materials*
	MTHSC 701	Number Systems for the Elementary Grades
Summer	ECON 751	Current Issues in Economics for Teachers
	ED 636	Clinical Supervision*
	ED 636	Update of School Law*
Fall	ECON 750	Economic Concepts and Classroom Applications for Teachers
	ED 434, 634	Teaching Writing*
	ED 636	Team Building*
	ED 762	Reading Diagnosis and Remediation
	ED 801	Seminar in Human Growth and Development
	ED 802	Human Development: Psychology of Learning
	ED 808	Educational Tests and Measurements
	ED 809	Analysis of the Individual
	MTHSC 701	Number Systems for the Elementary Grades

GREENWOOD

Spring	ED 635	Middle School Organization and Curriculum*
	ED 794	School and Community Relationships
	ED 798	Teaching Secondary School Reading
	ED 804	Advanced Methods of Teaching
	ED 811	School Finance
	ED 813	Educational and Vocational Informational Service and Placement
	ED 834	Educational Evaluation
	MTHSC 751	Fundamental Concepts of Calculus I
Summer	ECON 750	Economic Concepts and Classroom Applications for Teachers
	ED 705	Principles of Guidance
	ED 761	Reading Instruction in the Elementary School
	ED 765	Secondary School Curriculum
	ED 802	Human Development: Psychology of Learning
	ED 808	Educational Tests and Measurements
	ED 817	Development of Counseling Skills
	ED 820	Teaching Language Arts to the Exceptional Child
	ED 830	Techniques of Supervision: The Public Schools
	MTHSC 701	Number Systems for the Elementary Grades
	MTHSC 703	Modern Mathematics for Elementary School Teachers—Geometry
	MTHSC 730	Modern Geometry for Teachers
	MTHSC 783	Theory of Numbers
	PSYCH 683	Abnormal Psychology
Fall	ED 671	The Exceptional Child
	ED 720	School Personnel Administration
	ED 802	Human Development: Psychology of Learning
	ED 804	Advanced Methods of Teaching in the Elementary School

LEXINGTON

Fall	INED 410, 610	American Industries*

MOORE

Fall	INED 410, 610	Student Organizations*
	INED 451	Special Projects

MYRTLE BEACH

Fall	INED 410, 610	Preparation of Instructional Materials*

NEWBERRY		
Spring	ED 671	The Exceptional Child
Fall	ED 794	School and Community Relationships
OCONEE		
Fall	ED 635	Middle School Organization and Curriculum*
PENDLETON		
Spring	ED 864	Special Problems in Reading Education
PICKENS		
Spring	ED 864	Special Problems in Reading Education
Fall	ED 434, 634	Teaching of Writing*
ROCK HILL		
Summer	INED 410, 610	Program Development in Vocational Education*
SALUDA		
Summer	ED 864	Special Problems in Reading Education
Fall	AGED 869	Seminar
	ED 635	Basic Skills in the Mathematics Curriculum*
SENECA		
Spring	ED 864	Special Problems in Reading Education
	INED 424, 624	School Safety
Summer	INED 410, 610	Airbrush Techniques for Drafting*
SPARTANBURG		
Spring	ED 762	Reading Diagnosis and Remediation
Summer	INED 410, 610	Orientation in Industrial Organizations*
Fall	INED 410, 610	Student Organizations*
	INED 451	Special Projects
	INED 452, 652	Advanced Projects
	MTHSC 701	Number Systems for the Elementary Grades
WALTERBORO		
Spring	AGED 428, 628	Special Studies in Agricultural Education
Summer	AGED 428, 628	Special Studies in Agricultural Education
Fall	AGED 869	Seminar
WILLIAMSTON		
Spring	ED 634	Teaching the Gifted*
	ED 864	Special Problems in Reading Education

*Special Institute Course

STUDENT REGISTER

ASSOCIATE AND BACHELORS' DEGREES CONFERRED MAY 7, 1982

COLLEGE OF AGRICULTURAL SCIENCES

LUTHER PERDEE ANDERSON, Dean

BACHELOR OF SCIENCE

Agricultural Economics and Rural Sociology

Laurie Wyche Allen ____ Latta
Laura Jeanne Blue ____ Greenville
Thomas Andrew Davis ____ Clover
Judy Anne Harriett ____ Lodge
Thomas Randolph Ligon ____ Chester
John Douglas Riddle, Jr. ____ Taylors
Barry Julian Stevenson ____ Townville
Viviane Audrey Hulda Varin ____ Greenville
Owen Lane Wallace ____ Dillon

Agricultural Mechanization and Business

Harold Calhoun Cheek, Jr. ____ Clinton
Joe Lawson Dunn ____ Pickens
Lloyd Dale Gibson ____ Easley
Jackson Edward Greene, Jr. ____ Travelers Rest
David Michael Turnipseed ____ Williston
Anthony Scott Weatherford ____ Oswego

Animal Industries

Mary Kathleen Ackerman ____ Clemson
*Dwight Leon Bowen ____ Antreville
John Mark Branyon ____ Landrum
*Robin Alan Brown ____ Woodruff
Thomas Peter Cimino ____ Tampa, Fla.
Michal Maree Clark ____ Mt. Pleasant
Stephen George Colquhoun ____ Columbia
*Penny Lee Earls ____ Blacksburg
Donna Lucile Edwards ____ Latta
Karen Camille Ellison ____ Greenville
James Bartlett Garrison ____ Anderson
John Patrick Grimes ____ Gaithersburg, Md.
William Brian Guthrie ____ Gaffney
John Duncan Jett ____ Denmark
Robin Reid Knox ____ Greenville
*Sophia Elaine Long ____ Prosperity
*Jeffrey Clay Lovin ____ Lancaster
Ann Michele Magda ____ Mt. Pleasant
Charles Shellhouse Matthews ____ Rock Hill
Audrey Lynn McElmurray ____ Jackson
*Dianne McFarlane ____ Patchogue, N. Y.
John Ulmer McGregor ____ Hopkins
Dwight Asa Moore, Jr. ____ Chesnee
Louie James Moore III ____ Starr
James Edward Neal, Jr. ____ Woodruff
Andrew Wells Nickles ____ Hodges
Charles Derrick Quarles ____ McCormick
***Charles Richard Ruff ____ Newberry
Terry Wayne Smoak ____ Cordova
Phillip Kevin Staggs ____ Gowensville

Economic Biology

Terry Kay Blackwell ____ Arden, N. C.
David Williams Byron ____ Mt. Lebanon, Pa.
James Milton Townsend III ____ Bennettsville
Albert Allen Weathersbee III ____ Columbia

Food Science

Bonnie Marie Bowie ____ Due West
Patricia Kathryn Epper ____ Charleston
Raymond Joseph Lundy ____ Levittown, N. Y.
Georgette Jamie Perna ____ Greenwich, Ct.

Plant Sciences

Ronald O'Neal Belue ____ Inman
Gregory Robert Blaser ____ Summerfield, N. C.
Eric Patrick Britton ____ John's Island
Roger Dorland Brock ____ Lugoff
James Heyward Evans, Jr. ____ Cameron
*Carmen Elizabeth Glenn ____ Jenkinsville
*William Michael Hair ____ St. Matthews
Mary Elizabeth Hill ____ Clemson
William Elliott Johnson ____ Aiken
Peter Brian Kiessling ____ Clemson
William Carl Knox ____ Belmont, N. C.
*Rebecca Lella Lindsay ____ Spartanburg
Shirley Jena McClellan ____ McClellanville
Ellen Ruth McDonald ____ Lugoff
***Emily Hale Moss ____ Greenville
Mitchell Bain Owen ____ Clemson
Sheila Elaine Owen ____ Anderson
Phillip Anthony Polk ____ Aiken
Adella Anne Richardson ____ Greenwood
Stephen Dalton Rivers ____ Spartanburg
Charles Ellington Ryan ____ Chester
George Brumitte Sanders ____ Fairfax
Robert Eric Shelton ____ Hollywood
William Lee Skelton ____ Clemson
Fredric Keith Tritapoe ____ Graniteville
Brenda Sue von Tungeln ____ Clemson
Allison Ruth Walters ____ Salisbury, N. C.
Linda Sue Williams ____ Fairfax, Va.
Stewart Peter Winslow ____ Union
Luann Addison Wolfe ____ Fairfax, Ala.

Pre-Professional Studies

Thomas Wright Barlow ____ Waynesboro, Va.
Thomas Middleton Dantzler ____ Goose Creek
Winston Marshall Eaddy ____ Mt. Pleasant
**Nancy Hughston ____ Spartanburg

COLLEGE OF ARCHITECTURE

HARLAN EWART McCLURE, Dean

BACHELOR OF ARTS

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Henry Harmon Carroll, Jr. _____ Allendale
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Larry Dale Davis _____ Kissimmee, Fla.
Daniel James Gerding _____ Gatlinburg, Tenn.
*Robert Legare Grayson, Jr. _____ Charleston
*Catherine Eleanor Haas _____ Taylors
Mark Gilmore Hitchcock _____ West Chester, Pa.
Thomas Vincent Markham _____ Charleston
Dale Michael Marshall _____ Wilson, N. C.
George Andrew Melissas _____ Charleston
Celia Ann Miller _____ Jefferson
Michael Patrick Murphy _____ Clemson
Karen Elizabeth Royster _____ Myrtle Beach
David Scott Seibert _____ Toms River, N. J.
Christine Leona Tedesco _____ Spokane, Wash.
Laura Elizabeth Westcott ____ Kennedyville, Md.

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Building Science and Management

Mark Major Allison _____ Atlanta, Ga.
Jeffrey Lee Baker _____ Tallahassee, Fla.
Robert Harri Brax _____ Spartanburg
Ray Pitts Hoke _____ Clemson
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Thomas Alfred Mayberry _____ Mt. Pleasant
Charles Randolph McCreight, Jr. _____ Sumter
Richard David Michael _____ Summit, N. J.
Gerald Edward Ringer, Jr. _____ Columbia
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**Leslie Dean Sullivan _____ Columbia
William Floyd Thomason _____ Hickory, N. C.
Olin Daniel Thomson, Jr. _____ Spartanburg
George Herbert Worthington IV _____ Clemson
Gregory Finley Young _____ Clemson

Design

Ali Akbar Alam Taghizadeh _____ Ahwaz, Iran
Christian Wayne Arnold _____ Central
Hamid Reza Baher _____ Tehran, Iran
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*William Scott Baker _____ Mullins
Robert Michael Barr _____ Lindenwold, N. J.
Michael Dominique Berninger _____ Newark, Del.
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Cynthia Delores Byrdic _____ Greeleyville
Joel Manning Carter _____ West Columbia
Johnny Pete Copses _____ Spartanburg
Scott Blakeslee Disher _____ Indialantic, Fla.
Thomas Mustin Fant _____ Columbia
Kurt Averill Flechtner _____ Ridgewood, N. J.
Henry David Fulmer III _____ Columbia
Margaret Douglas Harvey _____ Beaufort
Samuel Bennett Herin _____ Columbia
Heather Claire Hill _____ Princeton, N. J.
Judith Amy Hinchliffe _____ Delray Beach, Fla.
Mark Allen Hopper _____ Bolton, Ct.
William Russell Jaycox _____ Ocala, Fla.
*Toby Mason Kay _____ Spartanburg
Mark David Kogut _____ Hamburg, N. Y.
*Glenn Robert Lattanze _____ Charlotte, N. C.
Mark Lawrence McMinn _____ Columbia
Charles Stuart Muldrow _____ Monroe, N. C.
Joseph Martin Pazdan _____ Greenville
Peter Joseph Porretta _____ Folsom, N. J.
Palmer Douglas Quackenbush _____ Columbia
Brian Frank Ridgeway _____ Norwalk, Ct.
Jeffrey Scott Roark _____ Shelby, N. C.
David Wayne Rogers _____ West Columbia
Joel Keith Sims _____ Camden
Brad Brown Smith _____ Spartanburg
*John Clarkson Templeton ____ High Point, N. C.
Martha Denise Thompson _____ Rock Hill
Richard Travaglini _____ Bloomfield, N. J.
Mark Bradsher Trollinger _____ Asheboro, N. C.
John Thomas Truluck _____ Olanta
Laura Jane Williams _____ Easley

BACHELOR OF ARCHITECTURE

David Joseph Hosang _____ Aiken

COLLEGE OF COMMERCE AND INDUSTRY

RYAN CUSTER AMACHER, Dean

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Economics

*Lucy Cloaninger Bowen _____ LaGrange, Ga.
Catherine Phoebe Callaway _____ Greenville
Richard Earl Glenn _____ Greer
*Steven Marc Hayes _____ Pickens
**Sarah Elizabeth James _____ Greenville
Richard John Luckangelo _____ Philadelphia, Pa.
**William Walter Pepper _____ Georgetown, Del.
*Tamara Nan Sillay _____ Norcross, Ga.
*Pamela Jean Wentworth _____ Stamford, Ct.

BACHELOR OF SCIENCE

Accounting

Cheryl Lynn Adams ---------- West Columbia
*Natalie Jane Adams ---------- Union
Emmanuel Adebowale Adekunle
---------- Ogbomosho, Oyo, Nigeria
Janet Arey ---------- Greenville
Lou Ann Atkins ---------- Inman
Richard Earl BeDen ---------- Mullins
Michael Randolph Byrd ---------- Charleston
Mary Elizabeth Chapman ---------- Rock Hill
William Joseph Condon, Jr. ---------- Mt. Pleasant
Donna Lynn Cowart ---------- Ellijay, Ga.
*Billy Bruce Dickson ---------- Anderson
John Ruggles Earle ---------- Miami Shores, Fla.
Robyn Ann Elrod ---------- Anderson
Kevin Lee Ewers ---------- Summerville
*Rebecca Burn Fennell ---------- Columbia
Richard Grant Fisher ---------- Greenville
Suzanne Fletcher ---------- North Augusta
Nancy Louise Folsom ---------- Jacksonville, Fla.
*Kyle Ann Franzman ---------- Marietta, Ga.
*Katherine Denise Greene ---------- Meridian, Miss.
Cheryl Marie Haigler ---------- Cameron
Debra Ann Hendricks ---------- Six Mile
Janet Elizabeth Herdman ---------- Greenville
Donna Lynn Hill ---------- York
Stewart Wesley Hurst ---------- Sumter
Cynthia Louise Johnson ---------- Ft. Lauderdale, Fla.
Mary Catherine Kay ---------- Atlanta, Ga.
*Jane Susan Kluttz ---------- Signal Mountain, Tenn.
Jeffrey Kepler Layman ---------- Hamilton, Ind.
***Gwendolyn Joye Logan ---------- Gaffney
Jeanne Mitchell ---------- Brownstown, Ind.
*Leslie Susan Otto ---------- East Hanover, N. J.
Michele Ann Pacewic ---------- Greenville
Ginger Lynn Page ---------- Spartanburg
James Jordan Peebles ---------- Columbia
Jennifer Lisette Rigsby ---------- Charleston
Terry David Robertson ---------- Sumter
Laurie Jeanne Sampson ---------- Columbia
Preston Sanders Shealy, Jr. ---------- Camden
**William Lawson Spitz ---------- Hanahan
*James Edward Swan IV ---------- Columbia
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*Allyson Lotz Thrower ---------- Summerville
Karen Ann Watts ---------- Mt. Pleasant
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Thomas Allen Williams ---------- Lancaster
Marjorie Jane Zurn ---------- Camden

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Elizabeth Anne Bair ---------- Orangeburg
Ann Bissell Baker ---------- Charleston
Eugene Coy Baker ---------- Wallace
Teresa Darlene Barnes ---------- North Augusta
Archie Ingram Barron, Jr. ---------- Seneca
Edmond Russell Baxley, Jr. ---------- Johnsonville
*Craig Alan Bennett ---------- Gaffney
Barbara Marie Bissey ---------- Charleston
**Diane Griggs Blakeney ---------- Pageland
Michael Alan Bond ---------- Greenville
Susan Ann Bradshaw ---------- Charlotte, N. C.
Cynthia Alesia Brazell ---------- Marietta, Ga.
Samuel Mark Brunson ---------- Greenwood
James David Burks ---------- Greenville
***Laurie Kathryn Bussey ---------- Ruston, La.
Sandra Lorraine Byrd ---------- Florence
Carol Hugh Calcutt, Jr. ---------- Pamplico
*Ben Mitchell Clary ---------- Gaffney
Cynthia Loraine Cooper ---------- Columbia
Mary Louise Cranshaw ---------- Columbia
Carol Ann Crawford ---------- Chesterfield
Robert John Crawford ---------- Spartanburg
Beverly Faye Cromer ---------- Columbia
*Rebecca Elizabeth Dalton ---------- Asheville, N. C.
David Richard Davies ---------- Charleston
William Edward deBorde ---------- Columbia
**Christopher Vincent Dodds ---------- State College, Pa.
English Kuhne Drews ---------- Charleston
Thomas Ervin Elliott ---------- Greenville
Kendra Lane Elrod ---------- Greer
Randy Lewis Elrod ---------- Piedmont
Randy Dean Epps ---------- Marietta
Roger Scott Ewing ---------- Clemson
William Edward Flanagan ---------- Florence
Ralph Nixon Floyd, Jr. ---------- Bloomington, Ind.
Brenda Diane Fowler ---------- Greenville
Kenneth Randall Frady ---------- Spartanburg
Michael David Gillespie ---------- Pulaski, Tenn.
Carol Jean Gilstrap ---------- Greenville
Rebecca Tankersley Greene ---------- Travelers Rest
*Timothy Howell Gunnels ---------- Anderson
Lisa Leigh Hancock ---------- Charleston
*Jeffrey Bryce Hardwick ---------- Conway
Richard Lane Harrison ---------- Greenville
Anne Cooper Hartzog ---------- Orangeburg
Karen Renee Helton ---------- Spartanburg
Jo Kimberly Hollar ---------- Greenville
Ann Marie Holmes ---------- Seneca
Alice Edwine Howell ---------- Florence
Nelson Paul Jacobs ---------- Irmo
Gary Alan Jacques ---------- Taylors
Robert James Jacques ---------- Taylors
David Mark Johnson ---------- Easley
Stewart Evans Jones ---------- Florence
Paul Michael Joyce ---------- Greenville
Melissa Dawne Kilgore ---------- Anderson
Thomas Searcy Ledbetter ---------- North Augusta
Martha E. Littlefield ---------- Anderson
Carol Marie Loccarini ---------- Florence
Dale Minter Lyles ---------- Spartanburg
Charles Ray Mabry, Jr. ---------- Anderson
Ricky Douglas Mahaffey ---------- Greenville
Michael Paul Mahoney ---------- Manning
*Nora Drake McArthur ---------- Columbia
Laura Elizabeth McCall ---------- Hartsville
Juliana Louise McCormack ---------- Albany, Ga.
Lynn Lambert McCraw, Jr. ---------- Gaffney
Wilson Ashby McElveen III ---------- Sumter
Barry Scott McGraw ---------- Inman
Deborah Jean McLaurin ---------- Irmo
Judy Carol Medlock ---------- Summerville
Catherine Irene Meloy ---------- Austin, Texas
Kerri Elizabeth Melton ---------- Rock Hill
Kim Elizabeth Miller ---------- Seneca
Walter Buchner Mitchell ---------- Ocean City, Md.

Administrative Management (continued)

Joseph Dalton Moore, Jr. ____ Greenville
James Scott Morgan ____ Gaffney
Sally Elizabeth Morgan ____ Franklin Lakes, N. J.
Janice Lynn Murphey ____ Columbia
Julie Kaye Nabors ____ Laurens
Christopher Troy Nigro ____ Hamburg, N. Y.
Mark Dowdle Oldham ____ Columbia
Jane Elizabeth Oliver ____ Greer
*Eugie Lloyd Ott ____ Orangeburg
Anne Cecilia Parker ____ Charleston
Genevieve Parham Pearce ____ Mt. Pleasant
Cynthia Renee Pope ____ Charlotte, N. C.
Anthony Neal Price ____ Westminster
Peter Paul Prokop ____ Youngstown, Ohio
Page Lee Ramsay ____ Sumter
William Michael Revels ____ Williamston
Kathryn Louise Rice ____ Columbia
Timothy Clyde Rich ____ Arlington Heights, Ill.
Leila Dunlap Roddey ____ Rock Hill
Lawrence Keever Rogers ____ Loris
Charles Alan Rose ____ Atlanta, Ga.
Phil Scott Sargent ____ Liberty
Benjamin W. Satcher, Jr. ____ Lexington
James Lawrence Seaborn ____ Williamston
Eric William Seay ____ Spartanburg
Luther Floyd Shealy III ____ Clemson
Steven Wayne Simmons ____ Rock Hill
Steven Reid Simpson ____ Due West
Amy Lynne Smith ____ Clemson
William Cannon Smith, Jr. ____ Duncan
Martin Francis Stakem ____ Gaithersburg, Md.
David Scott Stapleton ____ Easley
Edward Andrew Stevenson III ____ Allendale
James Hardy Stevenson ____ Worton, Md.
Kathy Louise Stott ____ Columbus, N. C.
*Christina Franzouria Taylor ____ Aiken
James Edward Teal, Jr. ____ Central
Michael Steven Till ____ Walterboro
Diane Lynne Tillison ____ Greenville
Johnnie Wilson Turner III ____ Greenwood
Clyde Lee Watt ____ Rock Hill
Vicki Renee Webb ____ Greenville
Charles Faber West III ____ Spartanburg
Angela Joan Wingard ____ Lexington

Economics

Paul Francis Borrelli ____ Goosecreek
Roger Peace Harris ____ Greenwood
Carl Fred Harvey, Jr. ____ Moncks Corner
George McCelvey Hester ____ Calhoun Falls
Karen Carla Huey ____ Marietta, Ga.
Deena Jo Jensen ____ Louisville, Ky.
Leonard Todd McAlister ____ Williamston
Brendan Robert Moles ____ Closter, N. J.
Linda Lee Shaffer ____ Silver Spring, Md.
Sharon Alethia Smalls Simmons ____ Sumter
Robert Ryan Strom ____ Greenwood
Mark Allan Stroman ____ Ballston Lake, N. Y.
Lucian Kirk Vandoren ____ Chevy Chase, Md.
†***Mark David Wasserman ____ Rockaway, N. J.

Financial Management

Charles Edmond Allen ____ Greenwood
Alan Irvine Armour II ____ Delray Beach, Fla.
Grady Marvin Bales, Jr. ____ Walterboro
*Betsy Jo Ballard ____ Easley
Peggy Lynn Ballentine ____ Columbia
Robert James Banish ____ Greenville
David Charles Black ____ Greenville
Arup Kumar Bose ____ Clemson
Catherine Alstyne Bowman ____ Spartanburg
Thomas Gregory Bricker ____ Dallas, Texas
*Michael Ashley Brown ____ Florence
Mirenda Denise Brown ____ Walhalla
*Sherrill Kimberly Bullock ____ Creedmoor, N. C.
*Carl Edward Bussey ____ North Augusta
Christopher David Byrd ____ Greenwood
Tamara Dee Campbell ____ Spartanburg
Jeff Stuart Clark ____ Spartanburg
*James Edward Clay III ____ Greenville
Kay Harwell Cochran ____ Atlanta, Ga.
James Gregory Cooley ____ Honea Path
Greta Denise Copeland ____ Paris, Tenn.
Laura Lynn Crawford ____ Richmond, Va.
Joan Elizabeth Edwards ____ Walhalla
Leisa Kathleen Fader ____ Tulsa, Okla.
John Christian Faile ____ Easley
Kyle Robert Freed ____ Marietta, Ga.
Douglas Scott Gray ____ Atlanta, Ga.
James Wallace Hipp ____ Rock Hill
*David Bruce Holl ____ Schenectady, N. Y.
Michael Gary Hudgens ____ Greenville
James Keith Hudgins ____ Sumter
Sarah Catherine Huey ____ Tucker, Ga.
Guy Edward Johnson ____ Huntington, N. Y.
Timothy Loie Jones ____ Pelzer
John Kennedy Karegeannes ____ Spartanburg
Marvin Ethridge Key ____ Dunwoody, Ga.
Susan Pauline Latimer ____ Auburn, Ala.
**Malissa Ann Lewis ____ Pickens
Larus Anderson Lilley ____ Clemson
Michael Goodwin Mayer ____ Charlotte, N. C.
Russell Andrew McFall ____ Anderson
Kathy Lee Padgett ____ Greenville
John Wallace Pettigrew, Jr. ____ Edgefield
Sarah Burton Proctor ____ Conway
Donald Keith Reeves ____ Liberty
Michael Robert Richardson ____ Anderson
Charles Dayton Riddle III ____ Greenville
Paul William Schmitt ____ Spartanburg
Elizabeth Anne Sherer ____ Greenville
Floyd Clark Simpkins, Jr. ____ Woodruff
Teresa Stewart Sims ____ Greenville
Allen Burton Smith ____ LaGrange, Ga.
Beverly Deane Smith ____ York
George Newton Smith ____ Anderson
Shannon Leigh Smith ____ Pendleton
Denton Lee Roy Stargel ____ Pensacola, Fla.
Steven Kent Taras ____ Salem
Robert Grady Thompson ____ Clemson
Deborah Faye Walls ____ Greenville
Charlise Way ____ Holly Hill
Brian David Westover ____ Summerville
Andrew David White ____ Camden
Jimmy Hill Wickliffe ____ Greenville
*Debra Ann Wiggins ____ Eutawville

Industrial Management

Harold Earl Addis III _____ Greenville
Erzin Sabri Atac _____ Istanbul, Turkey
James Christopher Brown _____ Landrum
Cynthia C. Brownrigg _____ Greenville
Donna Louise Choplin _____ North Augusta
Charles Ray Coker _____ Anderson
Jesse Irvin Craft II _____ Houston, Texas
Marty Eugene Erskine _____ Anderson
**Susan Lynn Farthing _____ Rock Hill
Carl Marshall Kowalski, Jr. _____ Anderson
Gregory Mark Langford _____ Portland, Maine
Patrick Harold Lewis _____ Walterboro
Edward Spencer Little _____ Greenville
Robert Thomas MacNaughton, Jr. ____ Columbia
*David Gerard Mannella _____ Allison Park, Pa.
Lisa Kaye Martin _____ Laurens
*Carolyn Ruth McCanless _____ Orlando, Fla.
Kimberly Elaine Mitchell _____ Laurens
Donald Wayne Morris _____ Lake City
Robert Timothy Owens _____ Anderson
David Alexander Pattillo _____ Atlanta, Ga.
Mary Elizabeth Payne _____ Greenville
Ronald Gene Robinson _____ Columbia
David Dixon Sawyer _____ Louisville, Ky.
David Allen Simmons _____ Summerville
Susan Lynn Spearman _____ Simpsonville
David Frank Stoddard _____ Anderson
Thomas Hall Trively, Jr. _____ Seneca
Sherrie Gayle Watson _____ Bradley
Kevin Neal Wigington _____ Seneca

Textile Chemistry

***Terry Lee Gilstrap _____ Easley
James Wilson Layton _____ Stuarts Draft, Va.
Kathryn Marie Taylor _____ Goose Creek

Textile Science

Mary Lederle Carroll _____ Red Bank, N. J.
Michelle Alice Diaz _____ Upper Arlington, Ohio
Kamran Zakariai-Miandoab _____ Clemson

BACHELOR OF TEXTILE TECHNOLOGY

Anthony Steven Berryhill _____ Thomaston, Ga.
Randal Allen Broyles _____ Simpsonville
Catherine Annette Caughman ___ Charlotte, N. C.
Jeff Rowden Hooker _____ Aiken
Carl Melvin Huffstickler _____ Charlotte, N. C.
Phillip Keith Martin _____ Chesterfield
Deborah Ann Riser _____ West Columbia
Wayne Kemper Talley _____ Easley

COLLEGE OF EDUCATION

HAROLD FOCHONE LANDRITH, Dean

BACHELOR OF ARTS

Early Childhood Education

Susan Lachlan Bultman _____ Sumter
Lori Leigh Byars _____ Gaffney
*Mary Lewis Christopher _____ Spartanburg
Cynthia Diane Cureton _____ Central
Laurie Lee Derrick _____ Little Mountain
Holly Denise Ferqueron _____ Ninety Six
Darlyne Kathryn Foster _____ Gaffney
Pamela Marie Garren _____ Greenville
Janice Lavonia Haney _____ Greenville
**Sarah Catherine Hukill _____ Harbeson, Del.
Susan Owings Inabinet _____ Hartsville
Patricia Kim Lankford _____ Potomac, Md.
Elizabeth Leigh Lester _____ Clover
Donna Kay McCauley _____ Laurens
Julia Ann McGill _____ Bennettsville
Tracy Liane Metcalf _____ Spartanburg
Lisa Anne Mitchell _____ Spartanburg
Janie Louise Moss _____ Blacksburg
*Gail Wilson Nicholson _____ Pickens
Susan Lynn Riddick _____ Columbia
*Mary Ethel Rochester _____ Seneca
**Jean Marie Sanders _____ Athens, Ga.
Betty J. Scott _____ Greenwood
Sharon Anne Stagg _____ Tampa, Fla.
Jean Marie Thomason _____ Simpsonville
*Jane Wilson Thompson _____ Spartanburg
Letha Anne Trusty _____ Greenville
**Deborah Ruth Watkins _____ Greenville

Elementary Education

Carolyn Barr Anderson _____ Weston, Ct.
Lisa Carole Beales _____ Summerville
Deborah Lynn Bell _____ Fairfax, Va.
Abigail Black _____ Taylors
**Cathy Allen Brock _____ Mauldin
Cynthia Petty Burchfield _____ Seneca
Susan Margaret Burkart _____ Manassas, Va.
Elizabeth Carroll Chambers _____ Beaufort
Patricia Lynne Coleman _____ Greenwood
Pamela Lorine Cooley _____ Pelzer
Lisa Ann Dabbs _____ Sumter
Debbie Jane Daigneault _____ Montreal, Canada
Miley Karla Daniel _____ Hemingway
***Sallie Diane Dorroh _____ Silverstreet
Roxie Lee Fisher _____ Honea Path
Jan Brown Freeman _____ Columbia
Gloria Ann Gambrell _____ Anderson
Patricia Norris Greene _____ Spartanburg

Mechanical Engineering

*John Snyder Church ---------- Aiken
**David William Clark ---------- Palatka, Fla.
Dana Grant Darley ---------- Atlanta, Ga.
Jeffrey Brian Hawes ---------- Walterboro
Gary Beck Hayden ---------- Ladson
**Max Alan Hipps ---------- Simpsonville
*David Mark Johnson ---------- West Sayville, N. Y.
Valerie Ann Klengson ---------- Taylors
Robert Bruce Looney, Jr. ---------- Aiken
Lawrence Lee Mackinson ---------- Van Wyck
David Scott Maw ---------- Spartanburg
Johnny Wayne Merck ---------- Six Mile
Michael Karl Natusch ---------- Clover
Stephen DeWitt Nester ---- Basking Ridge, N. J.
Joe Reid Price, Jr. ---------- Taylors
Jon Paul Rust ---------- Great Valley, N. Y.
Thomas Charles Shultzaberger -- Cortland, N. Y.
Mark Allan Smith ---------- Greenville
**Stephen Wayne Steadings ---------- Spartanburg
Jack Edwin Wooten ---------- Greenville

COLLEGE OF FOREST AND RECREATION RESOURCES

BENTON HOLCOMB BOX, Dean

BACHELOR OF SCIENCE

Forest Management

Charles Preston Fout ---- Fort Lauderdale, Fla.
Michael Chris Georges ---------- Greenville

Recreation and Park Administration

James Earl Bennett III ---------- Cheraw
John Nicholas Bowman ---------- Crossville, Tenn.
Susan Elizabeth Cudd ---------- Spartanburg
Sylvia June Floyd ---------- Marion
Suzanna Louise Gailey ---------- Mt. Lebanon, Pa.
Thomas Glen Gray ---------- Lyman
Rhonda Kay Lisk ---------- Rock Hill
Gary Edward Ludwig ---------- Wayne, N.J.
George Patrick McLeer ---------- Chamblee, Ga.
Kim Marie Phillips ---------- Pacolet
*Susan Bynum Platt ---------- Columbia
Pamela Savonne Putman ---------- Greenville
Dale Lee Randall ---------- Spartanburg
Donna Marion Schneider ---------- Anderson
Karen Aleise Schultz ---------- Aiken
James Leo Speros ---------- Potomac, Md.

Wood Utilization

Sarah Jane Lupfer ---------- Kissimmee, Fla.

COLLEGE OF LIBERAL ARTS

ROBERT ALFRED WALLER, Dean

BACHELOR OF ARTS

English

Nancy Savold Barber ---------- Williamsburg, Va.
Gary Keith Brackett ---------- Seneca
Sheri Ann Ramsay ---------- North Augusta
James Dickens Rodeffer - Fernandina Beach, Fla.

History

Lisa Rebecca Smolowsky ---------- Langley

Modern Languages

Amy Teresa Anders ---------- Cleveland

Political Science

Mary Ann Margaret Argen ---------- Buffalo, N. Y.
Robert Russell Boggs ---------- Anderson
Colleen Ann Kelly ---------- Short Hills, N. J.

Psychology

Michael Reed Clarke ---------- Pickens
Sabrina Ann Harrison ---------- Greenville
Thomas Franklin McAfee IV ---------- Greenville
Julie Leslyn Richards ---------- Cocoa Beach, Fla.
Shelia Doris Richardson ---------- Seneca
Julia Foster Richey ---------- Liberty

Sociology

Kerrie Sue Bunting ---------- Herndon, Va.
Marjorie Teresa Capps ---------- Marietta
Sandra Lee Diekroeger ---------- Atlanta, Ga.
Marc Patrick Fagan ---------- Little Silver, N. J.
Kimberly Stevenson Hurley ---------- Gray Court
Jerrie Lynn Montjoy ---------- Greenwood
Jane Claire Zeigler ---------- North Augusta

Double Major

English and History

*Elizabeth Schuyler Coykendall -- Landgrove, Vt.

COLLEGE OF NURSING

MARY MARGARET LOHR, Dean

BACHELOR OF SCIENCE

Nursing

Sally Kirkland Gray _____ Orangeburg
Theresa Ann Sims _____ Greenville

COLLEGE OF SCIENCES

HENRY ELLIOTT VOGEL, Dean

BACHELOR OF ARTS

Mathematical Sciences

John Bural Zeigler _____ Florence

BACHELOR OF SCIENCE

Computer Science

Elizabeth Allen Flowers _____ Deland, Fla.

Geology

Kathleen Annette Goggans _____ Greenville
Richard Allynn Hill _____ Greer
James Dean Kotti _____ North Augusta
*George Wesley McCall _____ New Prospect
George Edward Springston _____ New Prospect

Mathematical Sciences

Michael Alton Campbell _____ Camden
Rodney Dale Madden _____ Belton
Charles Holland McKnight _____ Shreveport, La.
Mark Stephen Mulkey _____ Orangeburg

Medical Technology

**Polly Anne Fagg _____ Anderson
**Tommie Rhetta Hamlin _____ Anderson
Larry Wayne Moore _____ Pageland
*Karen Anne Musen _____ Blackville
Cindy Darlene Risinger _____ Lexington
Eva Traylor Shaw _____ Macon, Ga.

Microbiology

Robert Steven Clark _____ Greenville
Tracy Yvonne McBee _____ Greenville

Physics

Dean Ellison Belk _____ Darlington

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* Cum laude: A grade point ratio of 3.40 to 3.69

** Magna cum laude: A grade point ratio of 3.70 to 3.89

*** Summa cum laude: A grade point ratio of 3.90 to 4.00

† Senior division honors: The students so designated have earned a B or better in 12 credits of honors work at the upper division level, have a minimum GPR overall of 3.00, and have been recommended by their department or college.

MASTERS' AND EDUCATIONAL SPECIALIST DEGREES CONFERRED AUGUST 7, 1982

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

MASTER OF AGRICULTURE

Mitchell Edgar Binnarr _____ Goose Creek
Ijeoma Ndidi Elizabeth Iriele ____ Lagos, Nigeria
Ibrahim Rashid Najim _____ Kwesindjak, Iraq
Constantino Vasilious Nicopoulos _ Shelby, N. C.
Philip Rodney Perry _____ Saluda

MASTER OF NUTRITIONAL SCIENCES

Margaret Worthington Kemp _____ Welcome, Md.
Curtis Warren Wolfe _____ Denver, Colo.

MASTER OF SCIENCE

Agricultural Economics

Vickie Jordan Alexander _____ Townville
John Clark Bergstrom _____ Silver Spring, Md.
Miriam Olga Hair _____ Greenwood
George Herbert Miller _____ Nassau, Bahamas

Agronomy

Edward Leland Ramseur _____ Greenville

Animal and Food Industries

Michael Frederick Zink _____ Piedmont

Entomology

Douglas Roy Allen _____ Aiken
Anthony Lee Estes _____ North Vernon, Ind.
Billy Wayne Fuller _____ Phenix City, Ala.
Edward Miles Jones _____ Kinston, N. C.
William Randolph Martin _____ Park Forest, Ill.

Nutrition

Jay Russell Bishop _____ Newry
Christine Mona Gagne _____ Miami, Fla.
Heidi Anne Heidecker _____ Waterford, Pa.
Elizabeth Ann Nichter _____ Anderson

Wildlife Biology

Dean Edward Harrigal _____ Aiken
Susan Pete Heller _____ Easton, Pa.

COLLEGE OF ARCHITECTURE

MASTER OF ARCHITECTURE

Charles Thomas Vinson _____ Alexandria, Va.

COLLEGE OF COMMERCE AND INDUSTRY

MASTER OF ARTS

Economics

Patricia Joan Euzent _____ Baltimore, Md.
Woodrow Wilson Hughes, Jr. _____ Taylors
Sharon Bowen Watson _____ Greenville

MASTER OF SCIENCE

Management

Van George Haven Clouse _____ Spartanburg
Zehra Mine Elicin _____ Nicosia, Cyprus
James Hugh Horner, Jr. _____ Chester

COLLEGE OF EDUCATION

EDUCATIONAL SPECIALIST

Administration and Supervision

Gilda Ann Alexander ..... Easley
Ronnie Rex Black ..... Easley
Thomas Walter Williams ..... Greenwood

MASTER OF AGRICULTURAL EDUCATION

(Agricultural Education is jointly administered by the College of Agricultural Sciences and the College of Education.)

David Byrne Fleming ..... Liberty
Cynthia Gaertner Moore ..... Greenville
Samuel Fulton Roper ..... Piedmont

MASTER OF EDUCATION

Administration and Supervision

Janell Harris Alston ..... Greenwood
Debra Jean Cox ..... Taylors
Elizabeth Boozer Dalton ..... Pickens
Joe Malcolm Dowis ..... Seneca
David Fogg Hall, Jr. ..... Greenville
Thomas Lewis Joy ..... Piedmont
Jerry Edward Lyles ..... Westminster
Betty Willis McDaniel ..... Pickens
William Burke Royster ..... Anderson
Ann Drennon Self ..... Anderson
Timothy Charles Swain
..... International Falls, Minn.
Pellianne Seegars Vaughn ..... Clemson

Elementary Education

Mary Linda Aichele ..... Charleston
Gail Fields Ashley ..... Honea Path
Ann Dillashaw Botts ..... Abbeville
Nancy Jackson Bryson ..... Six Mile
Marilyn Wilson Buchanan ..... Laurens
Marsha Thompson Campbell ..... Anderson
Julia Jay Day ..... Greenville
Ann Beckham Gainey ..... Dillon
Clarence Elwell Gilstrap, Jr. ..... Sunset
Berta Kay Hagler ..... Laurens
Deborah Anne Hatchell ..... Ware Shoals
Malissa Wilson Hawkins ..... Greenville
Elaine Graham Heller ..... Cary, N. C.
Tracey Leigh Hendrix ..... Anderson
Brenda Ward Knight ..... Anderson
Nancy Padgett Lanford ..... Walterboro
Miriam Ballentine Leaphart ..... Prosperity
Jill Gossett Martin ..... Spartanburg
Sharon Raylene Morgan ..... Greenville
Cathy Craft Neely ..... Greer
Mary Frances Parker ..... Anderson
Ralphine Estes Patterson ..... Clinton
Sandra Hogsed Payne ..... Toccoa, Ga.
Willette Poole ..... Westminster
Nancy Hagood Rhyner ..... Pickens
Carol Cleland Rowland ..... Westminster
Jean Haddon Schelechow ..... Donalds
Lynne Renee Smith ..... Orangeburg
Alice Parnell Thompson ..... Greenwood
Mildred Long Unger ..... Silverstreet
Martha Ann Vaughan ..... Fountain Inn

Personnel Services

Elizabeth Mae Black ..... Greenville
Susan Wright Coleman ..... Anderson
Linda Watkins Fashanu ..... Anderson
William Neal Hicks ..... Pendleton
Janet Lee Jones ..... Ware Shoals
Paula Cole Keller ..... Clemson
Blondell Benson Nesbitt ..... Woodruff
Linda Lee O'Kelley ..... Seneca
David Michael Phillips ..... Walhalla
Anne Henderson Reed ..... Simpsonville
Brigitte Schran Scott
..... Leverkusen, West Germany
Melinda Lee Scott ..... Aiken
Melanie Jane Williams ..... Clemson
Sara Elizabeth Wise ..... Greenville

Reading

Sarah Cunningham Beasley ..... Fountain Inn
Mary Bailey Bryson ..... West Union
Edna Diann Curtis ..... Seneca
Katherine Garrett DuBois ..... Greenville
Jeryl Wittenberg Hollingsworth ..... LaCrosse, Wis.
May Copeland Hudson ..... Ehrhardt
Carol Ann Marie Kern ..... Clemson
Susan Yates Lark ..... Anderson
Karen Beth Lawrimore ..... Charleston
Georgia Westbrook Ormand ..... Easley
Donna Owens Tuten ..... Gainseville, Fla.
Patricia Stevenson Woodson ..... Greenwood

Secondary Education

Louise Showalter Rambo ..... Greenwood

MASTER OF INDUSTRIAL EDUCATION

Denise Boyd Grant ..... Andrews
Roger Edward Grippe ..... Corintli, N. Y.
Samuel Turner Ingram ..... Mooresville, N. C.
Theodore Foster King ..... Central
William Allan Langston ..... Seneca

COLLEGE OF ENGINEERING

MASTER OF SCIENCE

Agricultural Engineering

(Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.)

Charles Fletcher Armstrong _ Surgoinsville, Tenn.

Bioengineering

Michael Francis DeMane _____ Clemson
Kurt Wolfgang Markgraf ____ Belleair Bluffs, Fla.

Ceramic Engineering

Jean Marie Clinton _____ Columbia
Kurt Clinton Rowan _____ Greenville

Chemical Engineering

Joseph Francis Brainovich, Jr. _____ Charleston
Randolph Stephen Hahn _____ Spartanburg

Civil Engineering

William Owens Connor _____ Bowman
William Wyatt Hunter _____ Easley

Electrical Engineering

I-Tau Chang _____ Taipei, Taiwan
Eric Shih-Kuang Chen _____ Taipei, Taiwan
William Roy Lambert _____ Clemson
Hong Le _____ Taipei, Taiwan

Engineering Mechanics

Lih-Shyng Tzeng _____ Taipei, Taiwan

Environmental Systems Engineering

Margaret Elizabeth Markey __ Schenectady, N. Y.
Michael Earl Perry _____ Dothan, Ala.
Allison Djerf Ranson _____ Concord, Mass.
Melonie May Sviatyla _____ Vestal, N. Y.

Mechanical Engineering

Rajiv Vishnudutt Dubey _____ Bombay, India
Marion Kent Jenkins _____ Laurens

Systems Engineering

Jose Manuel Noriega Mendoza __ Mexico City, Mexico

COLLEGE OF FOREST AND RECREATION RESOURCES

MASTER OF FORESTRY

Robert Jay Chlebnikow _____ Hagerstown, Md.
Ronald Thomas Collins _____ Central

MASTER OF RECREATION AND PARK ADMINISTRATION

Jacquelyn Skinner Galphin ____ Wrightsville, Ga.
Denise Mills Kelly _____ Travelers Rest
Vickie Lynn Lang _____ Summerville
Colleen Shannon Robertson _____ Charleston

MASTER OF SCIENCE

Forestry

Bradford Lynn Barber _____ Aiken
Michael Thomas Mengak ____ Mountain Top, Pa.

COLLEGE OF LIBERAL ARTS

MASTER OF ARTS

English

James Stanton Beggs _____ Atlanta, Ga.
Samir Busovaca _____ Sarajevo, Yugoslavia
Donna Jean Gunter _____ Charlotte, N. C.
N. Luanne Jenkins Hurst _____ Greenville
Barbara Jeanne Ramirez _____ Seneca
Michael Edward Rukstelis ____ Flagstaff, Arizona
Janette Johnson St. Vincent _____ Clayton, Ga.

COLLEGE OF NURSING

MASTER OF SCIENCE

Family Health Nursing

Jessie Ivey Broderick _____ Mauldin
Lorraine Rodrigues Fisher _____ Pendleton

COLLEGE OF SCIENCES

MASTER OF SCIENCE

Biochemistry

Cindy Putnam Evans _____ Boiling Springs, N. C.

Chemistry

Ying Jo Wong _____ Hong Kong

Mathematical Sciences

Rhonda Lavern Aull _____ Pomaria
Orlyn Hans Bostelmann _____ Clemson
Karen Elizabeth Buell _____ Bethel Park, Pa.
Victor Chien _____ Shanghai, China
Mary Anne Fields _____ Louisville, Ky.
Cheryl Lynn Jones _____ Lakewood, Ohio
Patrick Joseph Lentz _____ Savannah, Ga.
Nancy Lee Smith _____ Pensacola, Fla.
Steven Jay Thobe _____ Maria Stein, Ohio
Timothy John Williams _____ Thibodaux, La.

Microbiology

Rebecca Crosby Armstrong _____ Clemson
Robert Keller Hall _____ Myrtle Beach
Barbara Susan Ink _____ Rockville, Md.
Luther Edgar Lindler _____ Taylorsville, N. C.
Lindsey Davis Lupo _____ Greenville

Physics

Cynthia LaVerne Cash _____ Statesville, N. C.

Zoology

Penny Burnett Travis _____ Washington, D. C.

DOCTORS' DEGREES CONFERRED AUGUST 7, 1982

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

DOCTOR OF PHILOSOPHY

Agronomy

Nancy Hilton Walker ---------- Anderson
B.A., Emory University
Dissertation: Selection for Stomatal Characteristics in Tall Fescue and Hardinggrass

Entomology

Robert William Kelley ---------- Clemson
B.S., Davidson College; M.S., Clemson University
Dissertation: The Micro-Caddisfly Genus **Oxyethira** (Trichoptera: Hydroptilidae): Morphology, Biogeography, Evolution and Classification

Plant Physiology

Kurt Darden Getsinger ---------- Chapel Hill, N. C.
B.S., Campbell College; M.A., East Carolina University
Dissertation: The Life Cycle and Physiology of **Egeria densa** Planch. in Lake Marion, South Carolina

COLLEGE OF COMMERCE AND INDUSTRY

DOCTOR OF PHILOSOPHY

Management Science

Lewis Andy Litteral ---------- Forest Park, Ga.
B.S., Georgia Southern College; M.S., Clemson University
Dissertation: An Integrated Model Set to Investigate the Effects of Design Alternatives on the Availability and Logistics Support Requirements of Weapon Systems

Michael David Oliff ---------- Fairfax, Va.
B.A., Appalachian State University
Dissertation: An Integrated Production Planning Model for Multi Product Parallel Processor Environments

John Franklin Rudisill ---------- Lincolnton, N. C.
B.A., Appalachian State University; M.S., Clemson University
Dissertation: A Simulation Model for Evaluating the Performance and Cost Effectiveness of a Residential Photovoltaic Energy System

Textile and Polymer Science

Deborah Alyce Kimmitt ---------- Liberty
B.S., M.S., Clemson University
Dissertation: Vapor Transport in Polymeric Membranes — Design and Development of a Semi-permeable Barrier Fabric

Joyce Alene Monson ---------- Hastings, Neb.
B.S., University of Nebraska; M.S., Clemson University
Dissertation: A Study of the Relationship Between Carpet Mechanical Properties and Increases in Carpet Dimensions During Use

COLLEGE OF ENGINEERING

DOCTOR OF PHILOSOPHY

Engineering

Lokeswarappa Rudrappa Dharani ---------- Bangalore, India
B.E., University of Mysore; M.Tech., Indian Institute of Technology Kanpur; M.S., Cranfield Institute of Technology

Dissertation: Analysis of a Hybrid, Uni-Directional Laminate With Damage (Field of Specialization: Engineering Mechanics)

John Davison Dietz ---------- Clemson
B.S., M.S., University of Illinois

Dissertation: Clarification Mechanisms for a Flocculent Slurry (Field of Specialization: Environmental Systems Engineering)

Dale Scott Feldman ---------- Bryan, Texas
B.S., Northwestern University; M.S., University of Dayton

Dissertation: Biological Spacers Around Percutaneous Implants: Histological Interface Study (Field of Specialization: Bioengineering)

Jimmy Eugene Fowler ---------- Lockhart
B.S., M.E., Clemson University

Dissertation: A New Vapor Budget Technique for Evaporation Measurement from Open Water Bodies (Field of Specialization: Civil Engineering)

Imtiaz Ul Haque ---------- Lahore, Pakistan
B.S., West Pakistan University of Engineering and Technology; M.S., Clemson University

Dissertation: Development and Use of Analytical and Experimental Techniques for the Estimation of Creep Coefficients for a Passenger Vehicle on a Roller Rig (Field of Specialization: Engineering Mechanics)

Walter Fleming Jones ---------- Anderson
B.S., M.S., Clemson University

Dissertation: Internal Damage Growth in Unidirectional Boron/Aluminum Composite Laminates (Field of Specialization: Engineering Mechanics)

Ashok Pandit ---------- Clemson
B.S., Indian Institute of Technology; M.S., Clemson University

Dissertation: Numerical Simulation of Contaminant Transport Problems in Groundwater Using the Finite Element Method (Field of Specialization: Civil Engineering)

John Russell Schultz ---------- Palos Park, Ill.
B.S., Purdue University; M.S., Clemson University

Dissertation: PACT Process Mechanisms (Field of Specialization: Environmental Systems Engineering)

COLLEGE OF SCIENCES

DOCTOR OF PHILOSOPHY

Biochemistry

Gordon Claude Cannon ---------- Honea Path
B.S., Clemson University

Dissertation: Carboxysomes and CO_2 Fixation in **Thiobacillus neapolitanus**

Chemistry

Stephen Frederick Clark ---------- Fabius, N. Y.
B.A., State University of New York at Potsdam

Dissertation: The Stereochemical Consequences of the Ligand Field Irradiation of d^6 Transition Metal Complexes

Gary Francis Hillenbrand ---------- Chillicothe, Ohio
B.A., Evansville College
Dissertation: Synthetic Approaches to Polyhydroxyagarofurans

Jack Fontaine McKenna ---------- Clemson
B.S., Clemson University
Dissertation: An Investigation of Deuteron Quadrupole Coupling Constants by Deuteron Nuclear Magnetic Resonance Spectroscopy

Mathematical Sciences

Roland Bertram Minton ---------- Richmond, Va.
B.S., Virginia Commonwealth University; M.S., Clemson University
Dissertation: An Operator Approach to Linear-Quadratic Stochastic Control Theory

Physics

Claud Franklin Elliott ---------- Robertstown, Ga.
B.S., North Georgia Collage
Dissertation: A Computer Study of a Variable Nonharmonic Oscillator Model and a Computer Simulation of the Mechanical Properties of Nonwoven Fabrics

Joe Dale Patton ---------- Wichita Falls, Texas
B.S., Midwestern University
Dissertation: A Study of the **in vivo** Kinetics and Thermal Inhibition of the Rejoining of Single-Strand Breaks Induced by Methyl Methane Sulfonate and the Repair of U. V. Induced Dimers in the DNA of Chicken Embryo Fibroblasts

Zoology

Mitchell Irwin Chernin ---------- Clemson
B.S., Southeastern Massachusetts University; M.S., University of Guam
Dissertation: Molecular Cloning and Expression of the Amylase Gene of **Drosophila pseudoobscura** in **Escherichia coli**

ASSOCIATE AND BACHELORS' DEGREES CONFERRED DECEMBER 21, 1982

COLLEGE OF AGRICULTURAL SCIENCES

LUTHER PERDEE ANDERSON, Dean

BACHELOR OF SCIENCE

Agricultural Economics and Rural Sociology

James Connally Bradley _____ Lexington
Carey Edwin Graham _____ Aynor
James Henry Johnson _____ Sardinia
Mark Lee Metts _____ Greenwood
Harold Gibson Solomons _____ Allendale
William Eugene Trado, Jr. _____ Anderson

Agricultural Mechanization and Business

Gary Buddy Lands _____ St. Augustine, Fla.
James Thomas Lollis, Jr. _____ Liberty
David Dewey Wannamaker _____ St. Matthews
Richard Benjamin Winchester _____ Pickens
Robert Alexander Youmans, Jr. _____ Furman

Animal Industries

**Harold Earl Arant _____ Bowman
Debbie Ann Berry _____ Saluda
Pamela Yeager Burnett _____ Newtown, Pa.
Rebecca Smith Grotheer _____ Clemson
Edwin Harris Laidlaw _____ Hanahan
Michael Anthony McCourt _____ Waterford, Conn.
Malcolm Carroll Moore _____ Starr
Donald Pitts Perry _____ Saluda
Charles Edward Phillips _____ Orangeburg
Mark Breland Polk _____ Islandton
Thomas Russell Robbins _____ Clemson
Phillip Ray Rucker, Jr. _____ Shelby, N. C.
David Allan Steele _____ Clemson
William Charles Wilson, Jr. _____ Williamston

Economic Biology

Mark Alan Baughman _____ Newberry
Rachel Elizabeth Cain _____ Florence
Claude Spurgeon Cobb, Jr. _____ Blacksburg
*Gail Dunham Godfrey _____ Anderson
William Martin Lewis _____ Aiken
Joseph Arthur Masneri _____ Darlington

Food Science

Betty Louise Ferguson _____ Winnsboro
Bruce Alan Hoffmann _____ Spartanburg
Debra Jean Shepherd _____ Bell, Cal.

Plant Sciences

**Gail Cunningham Alison _____ Tallahassee, Fla.
Julian Raffield Dixon, Jr. _____ Sumter
Lisa Funston _____ Charleston
Beverly Patricia George _____ Anaheim, Cal.
William Rhett Godfrey _____ Laurens
Daniel Browne Hodges _____ Belmont, N. C.
Mark Norville Veal Jones _____ Spartanburg
Renee Joan Keese _____ Clemson
Joel Pollard Kirven _____ Hartsville
Albert Webster Lynch _____ Lake City
Finian Fermin Makapugay _____ Columbia
Annie Elizabeth Nicholson _____ Denmark
Kathy Dale Jackson Parker _____ Spartanburg
**Kathleen Anne Steinbach _____ Spring Lake, Mich.
Lawrence William Young _____ Rock Hill

COLLEGE OF ARCHITECTURE

HARLAN EWART McCLURE, Dean

BACHELOR OF ARTS

Design

Jimmy Dale Head _____ Easley

BACHELOR OF SCIENCE

Building Science and Management

Matthew Peter Gallagher _____ Ridgewood, N. J.
David Leon Goff _____ Columbia
Jay Gilbert Hertzler _____ Carlisle, Pa.
Marty Paul Hodge _____ Matthews, N. C.
Brenda Evette Jivers _____ Cayce
Robert Houser Norton _____ Pendleton

Design

William Paul Horn _____ Deer Park, N. Y.
Zach Watson Rice _____ Anderson

BACHELOR OF ARCHITECTURE

David Lee Curle _____ Geneva, N. Y.

COLLEGE OF COMMERCE AND INDUSTRY

RYAN CUSTER AMACHER, Dean

BACHELOR OF ARTS

Economics

Lane Christopher Blanton, Jr. ____ Tavares, Fla.
*Mary Kathleen Bowman _____ Suffolk, Va.
Patrick Alan Duncan _____ Greenville
Suzette Rene Hess _____ Greenville
***Rob Roy McGregor III _____ Anderson
Donald Gregory Miller _____ Clemson

BACHELOR OF SCIENCE

Accounting

Jean Marie Aldridge _____ Greenville
Cynthia Lynn Alexander _____ Greenwood
*Linda Hartsell Carroway _____ Anderson
*Charles Scott Childers _____ Gaffney
Mark Thomas Christopher _____ Anderson
Cynthia Marchelle Clamp _____ Batesburg
John Campbell Clark, Jr. _____ Little Silver, N. J.
Kevin Robert Fenzl _____ Hamburg, N. Y.
Peggy Delane Gilmer _____ Honea Path
Timothy Emory Lollis _____ Anderson
Thomas Eugene Medlin _____ Gastonia, N. C.
*Joan Elizabeth Miller _____ Durham, N. C.
Jeffry Alan Newman _____ Aiken
Harold Scott Paris _____ Greenville
Mark Strickland Powers _____ Greenville
John Wilbur Riley III _____ Summerville
Douglas Allan Sparacino _____ Central
Robert Franklin Stephenson, Jr. _____ Lancaster
Christian Robert Stormer _____ Alexandria, Va.
David Gray Suggs _____ Anderson
Alred Clifford Waits _____ Doraville, Ga.

Administrative Management

Patricia Anne Barrett _____ Chapin
Richard David Bennett _____ Greenville
Edward Lawton Benton _____ Myrtle Beach
Robert Lee Blackwell, Jr. _____ Spartanburg
Michael Charles Boyd _____ Kingstree
**Jody Wade Burttram _____ North Augusta
Thomas Daniel Calcote _____ Charleston
Carol Elaine Caughman _____ Columbia
Linda Therese Cleary _____ Sarasota, Fla.
Roger Coy Cleveland _____ Columbia
David Sidney Cooper _____ Columbia
Thomas Eugene Cothran _____ Greer
William David Cox _____ Reidville
Cathy Ann Crump _____ Anderson
Michael Charles Cumbie _____ Vidalia, Ga.
Robert Anthony Delmar, Jr. _____ Hilton Head Island
James Bryant Edwards IV _____ Georgetown
John Dyer Fairey _____ Elizabethtown, Ky.
Sybil Gosnell Graham _____ Greenville
David Allan Grubbs _____ St. Matthews
Jonathan McMillan Hare _____ Orangeburg
**Cynthia Kay Harlin _____ St. Francis, Kansas
Harriet Hope Harmon _____ Anderson
Stuart Hugh Harmon _____ Anderson
Sidney Randolph Harris _____ Taylors
Steven LeGrande Harvin _____ Sumter
Rose Marie Higginbotham _____ Orangeburg
Dawn Darene Hinson _____ Greenville
Bradley Ted Hoover _____ Kingsport, Tenn.
Richard Paul Hudson _____ Kingsport, Tenn.
Rufus Monroe Inman II _____ York
Carl Douglas Kaufman _____ Lititz, Pa.
William Bruce Kelly _____ Lancaster
William Fitzgerald Kinross _____ Pawleys Island
Robert M. Kraeuter _____ Clinton, N. J.
Michael Alan Lawson _____ Clemson
William Robert Leaphart _____ Prosperity
Paul Thomas Lee _____ Taylors
Gary Edward Martin _____ Jupiter, Fla
Robert Alvin Martin _____ Anderson
Gerald Eugene Marullo _____ Clemson
Shanna Lee Morton _____ Asheville,N. C.
Michael Mansfield Newton _____ Walterboro
Milton Ira Ozmint _____ Iva
Katherine King Paget _____ Greer
Nollie Moore Patton _____ Gastonia, N. C.
Gregory Joe Quarles _____ West Union
Timothy Lee Rentz _____ Beaufort
John Dunlap Rhea _____ Rock Hill
Elizabeth Heath Shealy _____ Kingsport, Tenn.
Elizabeth Jane Sims _____ Cusseta, Ala.
Debra Dianne Skey _____ Greer
Stanley Kevin Smith _____ Aiken
Michael Edgar Snead _____ Bishopville
Charles Andrew Werts _____ Ninety Six
Pamela Susan Wilson _____ Hilton Head Island

Economics

Marion Howard Adams _____ Jackson, Wy.
David Geoffrey Barnfield
_____ Wolverhampton, England
Jerry Joseph Cox, Jr. _____ Loris
Bruce Ecroyd Hinkle _____ Bay Shore, N.Y.
Christopher Edson Knight _____ Miami, Fla.
Robert Edward Provost, Jr. _____ Greenville
Emanuel Lloyd Taylor III _____ Columbia

Financial Management

Thomas Williams Alexander, Jr. ___ Mt. Pleasant
John Claude Arledge _____ Greenville
Dennis Jerome Belton _____ Columbia
Gilles Conrad Cote _____ Charleston
Marion Lawrence Craine _____ Laurens
Alison Marie Dailey _____ Florence
Alison Elizabeth Floyd _____ Charleston
Riley Maxwell Gainer, Jr. _____ Hazlehurst, Ga.
Larry Dale Gosnell _____ Greenville
Sheri Anne Henderson _____ Taylors
Walter Martin Keene III _____ Greenville
*Scott Michael Kile _____ Marietta, Ga.
John William Laughlin _____ Varnville
*Tracy Lynn Lubkin _____ Beaufort
Steven James Lynch _____ Columbia
Rale Jeffrey Markovic _____ Cincinnati, Ohio
Charles Marvin Moss _____ Gaffney
James Frederick Norman _____ Greenville
Cecil Huntley Redfern, Jr. _____ Greenville
David Wayne Rumney _____ Greenville
Susanne Lea Salter _____ Spartanburg
Leland Alan Smith _____ Cheraw
Thomas Alexander Sparacino _____ Central
John Hugh Stephens, Jr. _____ Greenville
Patricia Wyant _____ Spartanburg
**Cathy Denise Young _____ Clinton
Kenneth Thomas Young, Jr. _____ Walterboro

Industrial Management

Larry Kenneth Anthony, Jr. _____ Easley
James Vernon Ashmore _____ Greenville
Mary Heather Bland _____ Swannsboro, N. C.
Edwin Vernon Cantrell _____ Greer
Kirk Todsen Carter _____ Greenville
Josiah Crudup III _____ Anderson
Richard Dean Day _____ North Augusta
Caroline Gary Eason _____ Charleston
Charles Kent Faulkenberry _____ Greenville
Michael Glenn Glaesner _____ Charleston
Allen Anderson Guest _____ Seneca
William Baxter Harley, Jr. _____ Columbia
Lynnette Rosalie Holladay _____ N. Charleston
Robert Browning Holland, Jr. _____ Fountain Inn
Perry Manly Jenkins _____ Barnwell
John Andrew Olcott _____ Millersville, Pa.
William Ricky Turner _____ Greer

BACHELOR OF TEXTILE TECHNOLOGY

Omobolaji Adeola Awolola
_____ Ora-Igbomina, Oyo State, Nigeria
Laura Fay Kennedy _____ Summerville
Daniel Bradley Nalley _____ Easley
Karl Dana Opperman _____ Greenville
Joseph Anthony Smith _____ Anderson

COLLEGE OF EDUCATION

JAMES EDWARD MATTHEWS, Acting Dean

BACHELOR OF ARTS

Early Childhood Education

**Denise Davisson Brown _____ Woodruff
Helen Ramey Carroll _____ Mountain Rest
Teresa Lynn Gilley _____ Clemson
Ellen Easter Jarrard _____ Greenville
Zoe Anne Jones _____ Dalton, Ga.
Patricia Susanna Nelson _____ Salem

Elementary Education

Alma Kay Capps _____ Seneca
**Felecia Pace Dunlap _____ Clemson
Celia Ann Erskine _____ Anderson
Pamela Denese Gilmer _____ Seneca
Sharon Leigh Jamieson _____ Pendleton
Kathy Haynes Martin _____ Williamston
*Marlene Masters McCoy _____ Easley
Kathy Anne Mitchell _____ Homer, Ga.
Nancy Carol Moore _____ North Augusta
**Sandra Lorraine Patterson _____ Belton
**Kathy Diane Somerville _____ Central
Rebecca Suzanne Tisdale _____ Simpsonville
*Patricia Ann Truax _____ Dillon

Secondary Education

Barbara Anne Patterson Adams _____ Seneca
Lola Alexander Burrell _____ Seneca
Amy Holliday Davis _____ Charleston
*Harriet Rebecca Dempsey _____ Oak Brook, Ill.
Michael Dean Hartle _____ Clarion, Pa.
Michael Wade Hayes _____ Anderson
Elaine Marie James _____ Huntingdon, Pa.
Charles Wallis McJunkin _____ Walhalla
James William Sexton _____ Fort Worth, Texas
Maryland Thomas _____ Roebuck
Alice Marie Tinsley _____ Fountain Inn

BACHELOR OF SCIENCE

Agricultural Education

(Agricultural Education is jointly administered by the College of Agricultural Sciences and the College of Education.)

Thomas Roy Dobbins _____ Townville

Industrial Education

Martha Ann Barton ---------- Clemson
Arthur Boyd Brickle ---------- Orangeburg
Terry Lee Corder ---------- Clemson
John George Fede ---------- Surfside Beach
Reginald Lee Gibson ---------- Anderson
Terri Denise Lynch ---------- Clemson
Vernon Lory Prosser ---------- Spartanburg
Gerald Archie Reeves, Jr. ---------- Lugoff
Mark Thomas Wishart ---------- Clemson

Science Teaching

*Janet Brown ---------- Anderson
***Lisa Lynne Cheesman ---------- Lakeland, Fla.
Gregory Alan Craig ---------- Otto, N. C.
Harriet Dannette Lowder ---------- Turbeville
Loretta Anders Lynch ---------- Easley

COLLEGE OF ENGINEERING

JOSEPH CHARLES JENNETT, Dean

BACHELOR OF SCIENCE

Agricultural Engineering

(Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.)

Stephen Walter Burton ---------- Iva
David Stanley Harrell ---------- Florence
Roy Howard Herron, Jr. ---------- Starr
*Lewis Ray Hubbard, Jr. ---------- Anderson

Ceramic Engineering

Dale Irvin Kendrick ---------- New Ellenton
Donald Lee Kiser ---------- Matthews, N. C.
Marc Wayne Norton ---------- Aiken
Robert Harper Senn ---------- Clemson
Paul Craig Spiller ---------- Greenwood
Kurt Eugene Waldhauer ---------- Beaufort

Chemical Engineering

Jerry Maurice Campbell, Jr. ---------- Mullins
Davis Edward Clark ---------- Clemson
*Kevin Mark Dubis ---------- Summerville
Gilbert B. Ellerbe III ---------- Midland, Mich.
Larry Eugene Good ---------- Taylors
Linda Wiesman Hayes ---------- Melbourne, Fla.
*John William Schrader ---------- Northfield, N. J.
Paul Dennis Schreuders ---------- Charleston
Stephen William Watts ---------- Highlands, N. C.
Jeffrey Wade Willis ---------- Charlotte, N. C.

Civil Engineering

Mark Alan Amick ---------- Greenwood
James Eldon Anderson ---------- Summerville
Tod William Anderson ---------- Lisle, Ill.
Joe Glenn Ballard ---------- Swannanoa, N. C.
Timothy Scott Bankhead ---------- Shelby, N. C.
William David Bozeman ---------- Greenville
Marshall Lee Brown ---------- Anderson
Dean Stephen Brunton ---------- Columbia
Henry Elmer Cartee, Jr. ---------- Hartsville
James Daniel Chism ---------- Greenville
Ralph Wesley Cooke ---------- Washington, N. J.
Bruce Edward Coy ---------- Chapin
Donald Eugene Dixon ---------- Rembert
George Betour Elzoghbi ---------- Darbeshtar, Lebanon
*Patrick Michael Fourspring ---------- Erie, Pa.
Benny Ray Friar, Jr. ---------- Florence
Eric Maurice Gardner ---------- Florence
William Norman Hamilton ---------- Easley
James Edward Henderson, Jr. ---------- Moncks Corner
Mark Evans Hester ---------- Piedmont
Charles Eugene Jackson ---------- Orangeburg
Ronald Edward Kirby, Jr. ---------- Knoxville, Tenn.
Wilbur Kenneth Little, Jr. ---------- Charleston
*Diane Kay Lotermoser ---------- Greenville
Gerald Wayne Mahaffee ---------- Seneca
Brenda Jean McCool ---------- Seneca
Albert Lee Neighbors ---------- Laurens
Daniel Mark Nesbit ---------- Marion, N. C.
David Roderick Paintin ---------- Wilmington, Del.
Henry Oneal Pickering ---------- Branchville
Kevin Mark Radford ---------- Beckley, W. Va.
Graham Watkins Rich ---------- Clemson
Joel Russell Sanders ---------- Hanahan
Charles Woodman Sidbury, Jr. ---------- Darlington
David Wayne Smith ---------- Greenville
*Marc Kevin Stecker ---------- Rutherfordton, N. C.
James Russell Tripp II ---------- North Augusta
John Robert Tuten ---------- Edgefield
James Alfred Vandeven, Jr. ---------- Whippany, N. J.
James Kent Van Ness III ---------- Charleston

Computer Engineering

Robert Allan Dickson ---------- Clemson
Michael Anthony Gearhart ---------- Goose Creek
Robert Wayne Godfrey ---------- Woodruff
Rhett Barnwell Myers II ---------- Moncks Corner

Electrical Engineering

Yousef Moh'd Abohijlih ..... Jerusalem
George Jefferson Ayer ..... Seneca
Cynthia Louise Birt ..... Barnwell
*Michael Chandler Brown ..... Greenville
Russell Steven Busch ..... Walhalla
***Cheryl Susan Campbell ..... Florence
John Roe Carter III ..... Huntsville, Ala.
Asif Javed Choudhry ..... Greenville
James Bruce Faust ..... Rock Hill
Richard Arthur Fettig ..... Inman
Barry Vann Fussell ..... Florence
Larry Miller Jones ..... Columbia
*Barry Randall Loftis ..... Iva
Edward Scott Lynch ..... Seneca
*Jeffrey Ernest Marine ..... Aiken
Edward Joseph Murphy ..... Deer Park, N. Y.
Tony Randall Phillips ..... Easley
William Thomas Ryan III ..... Hanahan
*Mary Crisler Sark ..... Savannah, Ga.
Dewey Kim Stemen ..... Greer
George Kevin Totherow ..... Rock Hill
Joseph Allen Wyse, Jr. ..... Inman

Engineering Technology

*Henry Wayne Andrews ..... Neeses
James Austin Beaty ..... Seneca
Jeffrey Young Bowers ..... Laurens
Kevin Robert Bray ..... Spartanburg
Mark Ansel Collins ..... Greer
Gregory Kirk Goodson ..... Sumter
Lorie Denise Hall ..... Summerville
Jack Randall Kelley, Jr. ..... Mauldin
Scott Edward Laird ..... Charlotte, N. C.
Patrick Emery McCarty ..... Batesburg
Michael David Myjak ..... Lexington
Randy Lee Oliver ..... Greenwood
Christian Schneider ..... Mauldin
Ricky Allen Shumpert ..... West Columbia
Ralph B. Simmons III ..... Charleston
Kent Douglas Walters ..... Columbia

Mechanical Engineering

Andrew Barrett Albenesius ..... Aiken
William Patrick Apps ..... Roswell, Ga.
Clete Rivers Blackwell ..... North Augusta
Brent Anthony Bobo ..... Pendleton
Terry Eugene Bowen ..... Piedmont
Robert Enly Brockman, Jr. ..... Taylors
Kenneth Fred Brown ..... Powdersville
James Simons Byers ..... Columbia
Steven Michael Coleman ..... Clinton
Richard Kent Crawford ..... Aiken
Harold James Dix ..... Greenville
John Bell Dunlap ..... Camden
John Carrol Epting ..... Newberry
Danny Keith Fowler ..... Greenville
Paul Jeffrey Gilstrap ..... Greenville
William Gordon Hamilton ..... Toccoa, Ga.
Roy Christian Hannes ..... Spartanburg
James Clark Hills ..... John's Island
William Thomas Hurst ..... Clemson
Michael Albert Jacob ..... Chattanooga, Tenn.
Teddy Miles Johnson III ..... Orangeburg
Thomas Michael Kerbaugh ..... Medford, N. J.
Thomas Lee Kierspe ..... Aiken
Thomas Edwin Martin ..... Camden
Keith Franklin Mattison ..... Spartanburg
Michael Wayne McCaslin ..... Chapin
Robert Dennis McCrary ..... Summerville
George Arthur Mobley, Jr. ..... Spartanburg
David William Moran ..... Rumson, N. J.
Wade Forrest O'Neal ..... Darlington
Christopher Alton Peeples ..... Estill
William Charles Post ..... Lavonia, Ga.
***Charles Whitney Propst ..... Moyers, W. Va.
Michael Scott Rimer ..... Spartanburg
John Ernest Salley ..... Salley
Tommy Joe Seay ..... Campobello
Winchester Smith IV ..... Williston
Scott Alan Sommerfeld ..... Oak Ridge, Tenn.
David James Tilly ..... Aiken
*Minh Thieu Tran ..... Piedmont
Francis Marion Wardlaw, Jr. ..... Troy
Harry Wolf Wechsler ..... Hampton
Jerry Lloyd Weed, Jr. ..... James Island
James Robbins Wilder ..... Sumter
Mark Eugene Wilson ..... Simpsonville
Roosevelt Word, Jr. ..... Fountain Inn
Michael Jerome Wright ..... Walhalla

COLLEGE OF FOREST AND RECREATION RESOURCES

BENTON HOLCOMB BOX, Dean

BACHELOR OF SCIENCE

Forest Management

Garry Wayne Anthony, Jr. ..... Charleston
**James Wiley Beasley ..... Central
Diana Glenda Bolt ..... Hamilton, Ohio
Christopher David Burns ..... Sumter
William Towe Havens ..... Columbia
Christine Anne Matonak ..... Columbia

Recreation and Park Administration

John William Box _____ Clemson
Wendy Jenean Burden _____ Liberty
*Wendy Jean Copelan _____ Beaufort
Vickie Lynn Cunningham _____ Simpsonville
Stephanie Chappell Deans _____ Greenville, Del.
Diana Marie De Vita _____ Mountain Rest
George Douglas Glover, Jr. _____ Lake Wylie
Rebecca Anne Heh _____ Anderson
Cynthia Lee Jones _____ Greer
Lisa Gaye Kingery _____ Aiken
Kristopher Alan Lemaster _____ Freehold, N. J.
Steven Eugene Mason _____ Aiken
Timothy Chandler Mays _____ Fair Play
Kenna Lee McIntyre _____ Wellesley Hills, Mass.
Graylin Parker Mears _____ McCormick
Susan Ivens Silance _____ Haddonfield, N. J.
Virginia Kirk Webb _____ Charleston
Scott Whitlock Weeks _____ Jackson
James Alan Weems _____ Norris
Robin Ann Wilhelm _____ Orlando, Fla.
Robbin Theresa Williams _____ Greer

COLLEGE OF LIBERAL ARTS

ROBERT ALFRED WALLER, Dean

BACHELOR OF ARTS

English

Nancy Louise Blair _____ Sharon
Melinda Carol Boggs _____ Seneca
Lisa Kay Carlton _____ Beaufort
Donna Kathryn Gerstemeier _____ Myrtle Beach
David Clark Hendricks _____ Central
Nancy Elizabeth Hoops ____ North Merrick, N. Y.
***Joyce Marie Keenum _____ Cary, N. C.
John Lawrence Mounter _____ Seneca
Emily Ann Richardson _____ Seneca
William Thornton Seabrook _____ Mt. Pleasant
John Snow Shores _____ Rock Hill
***Susan Eleanor Taylor _____ Anderson
Robert Arthur Vaughan, Jr. _____ Florence
*Kathleen Marie Walsh ___ Fort Washington, Md.

History

David Craig Boykin _____ Camden
Larry Dean Edgar _____ Columbia
Timothy Odell Williams _____ Seneca

Modern Languages

Michelle Lynn Howard _____ Anderson
Christianne Michelle Pensivy _____ McLean, Va.

Political Science

**Terresa Lynn Pierce Craven _____ Clemson
Dennis Daniel Diamond ____ Hillsborough, N. J.
Kathleen Ann Schempp _____ Greenville
Leonard Everick White _____ Rock Hill

Psychology

Virginia Claire Blevins _____ Summerville
Angela Maria Calcutt _____ Pamplico
David Carlisle Case _____ Pickens
Leesa Kay Cockfield _____ Florence
Susan Kathryn Fruit _____ Charleston
Robert Mark Kinkle _____ Louisville, Ky.
Russell William McConnell _____ Atlanta, Ga.
Douglas Owen Meredith _____ Anderson
Susan Catherine Pless _____ Dunwoody, Ga.

Sociology

Ann Louise Davis _____ Seneca
Pamela Jane Ross _____ Newtown Square, Pa.

Double Major

English and History

Michael Monroe Smith _____ Holly Springs

COLLEGE OF NURSING

MARY MARGARET LOHR, Dean

ASSOCIATE IN ARTS

Nursing

James Russell English _____ Seneca

COLLEGE OF SCIENCES

HENRY ELLIOTT VOGEL, Dean

BACHELOR OF ARTS

Mathematical Sciences

Teresa Tyson Rushing _____ Greenville

BACHELOR OF SCIENCE

Biochemistry

James Daniel Stoney _____ Summerville

Botany

Joan Drake Hughes _____ Orlando, Fla.

Chemistry

Mark Alan Kidd _____ Greenville

**Robin Celeste Sims _____ Camden

Computer Science

Milton Constantine Antonakos, Jr. ____ Anderson
Donna Lisa Bair _____ Orangeburg
Melanie Ann Basil _____ Columbia
Douglas Wayne Benfield _____ Asheville, N. C.
Robert Christopher Carl Drechsler ____ Clemson
Dawn Marie Fadel _____ Wilton, Conn.
Catherine Jenkins Frazier ____ Lawrenceville, Va.
Peter Edmonds Hite _____ Florence
James Arnold Loser, Jr. _____ Clemson
Daniel Phillip McCaskill _____ Clio
**Margaret Anne Mundy _____ Greer
Michael David Myjak _____ Lexington
Margaret Murray Platt _____ Rock Hill
Miriam Elizabeth Simmons _____ Charleston
James Kent Zetwick _____ Walhalla

Geology

William Albert Quarles _____ McCormick

**Jean Glocker Stillwell _____ Six Mile

Mathematical Sciences

Karen Lorraine Gambrell _____ Ninety Six
Nadine Suzanne Hassell
_____ Aruba, Netherlands Antilles
Cynthia Mary Klee _____ Rock Hill
Loraine Ellen Kukasch _____ Holmdel, N. J.

Medical Technology

Pamela Yvonne Henrioud _____ Atlanta, Ga.
John Philip Murray _____ Atlanta, Ga.

Microbiology

*Guy Robert Bibeau _____ Sumter
Newton Craig Brackett _____ Charleston
Thomas Lloyd Gailes _____ Stone Mountain, Ga.
Karen Grace Jarvis _____ Arnold, Md.
George Gregory Smith _____ Easley
Herbert B. Tyler, Jr. _____ Columbia

Physics

John Tilden Williammee IV
_____ Melbourne Beach, Fla.

Pre-Professional Studies

**Amy Jill Borenstein _____ Greenville
Susan Kathryn Mathewes _____ Greenville

Zoology

Suzann Elizabeth Bryant _____ Jamestown, N. C.

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* Cum laude: A grade point ratio of 3.40 to 3.69

** Magna cum laude: A grade point ratio of 3.70 to 3.89

*** Summa cum laude: A grade point ratio of 3.90 to 4.00

MASTERS' AND EDUCATIONAL SPECIALIST DEGREES CONFERRED DECEMBER 21, 1982

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

MASTER OF AGRICULTURE

Craig Stanley Corriher _____ China Grove, N. C.
Samuel Keith Fogle _____ Elloree
Raymond Leo Jacobs, Jr. _____ Columbus, Ohio
Stephen Ford Lightsey _____ Georgetown
Michael Edward Moore _____ New Ellenton
David Edward Qualls _____ Livingston, Tenn.
Morris Berry Warner _____ Greenwood

MASTER OF NUTRITIONAL SCIENCES

Kathy Louise Forrest _____ Saluda
Kim Rene Grooters _____ Valley City, N. D.
Maureen Anne Pezzulo _____ Utica, N. Y.

MASTER OF SCIENCE

Agricultural Economics

Debra Terrell Shedd _____ Bloomington, Ind.

Animal and Food Industries

Ajit Dinesh Tiwari _____ Richmond, Va.

Entomology

Steve Horosko III _____ Greensboro, N. C.
Joseph Kovach _____ Greenville
Gregory Terrell Payne _____ Bowman, Ga.
Leslie Ellen Schimmel _____ Dumont, N. J.
Randolph Delano Simpson, Jr. _____ Atlanta, Ga.

Horticulture

Thomas Robert Pagels _____ Bayport, N. Y.

Plant Pathology

Mary Helen Collins _____ Pawtucket, R. I.

Wildlife Biology

Michael Rogers Meador _____ Seaford, Va.

COLLEGE OF ARCHITECTURE

MASTER OF ARCHITECTURE

Michael Ward Behringer _____ Water Mill, N. Y.
Mary Lynne Bercik _____ Spartanburg
Richard Martin Fletcher _____ North Augusta
Jo Ann Grisham _____ Sumter
Louis Christian LeBlanc _____ Greenville
Susan Marie McAninch _____ Clemson
Joel Christopher Newman ___ Hilton Head Island
Harriet Ruth Todd _____ West Columbia
Carl Joseph Turner _____ Florence
Claude Edward Watt _____ Spartanburg
Gary Gene Woodward _____ Racine, Wis.
Manouchehr Zakariai Miandoab _____ Clemson

MASTER OF CITY AND REGIONAL PLANNING

James William Hill _____ Greenville

COLLEGE OF COMMERCE AND INDUSTRY

MASTER OF SCIENCE

Management

Melissa Jane McMahan _____ Greenville
Judy McWhite Pitts _____ Greer
Francis Podlasinski _____ Buffalo, N. Y.

Textile Chemistry

Hassan Khalafalla Khalefa _____ Mehalla, Egypt

Textile Science

Debora Jane Parks _____ Kernersville, N. C.
Rayna W. Smith _____ Easton, Pa.
Catherine Brosnan Thorpe _____ Atlanta, Ga.
Si Rang Yang _____ Shanghai, China

COLLEGE OF EDUCATION

EDUCATIONAL SPECIALIST

Administration and Supervision

Clifton Bernice Dodson ____ Rock Hill
Harriett Lee Rucker ____ Newberry

MASTER OF EDUCATION

Administration and Supervision

Mary Alexander McGuire ____ Nashville, Tenn.
John Crayton Pruitt III ____ Anderson
Judith A. Riley ____ Plainview, N. Y.
Charles Wayne Self ____ Anderson
Fauntelle Spellman ____ Anderson

Elementary Education

Rosemary Benjamin ____ Greenwood
Rosemary Kinard Bowers ____ Prosperity
Anne Hentz Caughman ____ Newberry
Anita Dooley Elrod ____ Martin, Ga.
Mary Adrienne Grubb ____ Greenville
Marlene McMullan Harris ____ Starr
Winnie Bentley Harrison ____ Greenwood
Sallie Rickenbacker Marshall ____ Anderson
Cynthia Celestine Dowling Pierce ____ Clinton
Sally Ann Shelton ____ Greenville
Colleen Kelsey Staton ____ Atlanta, Ga.
Linda Lea Sutherland ____ Greenville

Personnel Services

Corliss Scipio Anderson ____ Philadelphia, Pa.
Cynthia Bagwell Bunton ____ Pelzer
Margaret Moran Clendening ____ Kingsport, Tenn.
Barbara Flack Dorn ____ Callison
Keren Moore Gilmer ____ Greenville
Georgia Sipula Greenan ____ Greenwood
Allison Bennett Harris ____ Clemson
Timmi Lynne Haulbrook ____ Lugoff
Mamie Mills Reid ____ Pelzer
Sandra Dover Satterfield ____ Greenville
Vicki Denise Surratt ____ Greenville
Kathy Hazel Tate ____ Simpsonville
Marilue Stokes Taylor ____ Simpsonville
William Joseph Tommie, Jr. ____ Greenwood
David Lee Walton ____ Greenwood
Mary Gaillard Wells ____ Greenville

Reading

Judy Timmerman Bates ____ Greenwood
Jean Anderson Canady ____ Greenville
Theresa Pleasant Fogle ____ Pinewood
Melinda Dianne Marcengill ____ Westminster
Marilyn Elizabeth Raines ____ Easley

Secondary Education

Dondi LaVerne Brown ____ Honea Path
Marion Esther Greene ____ Seneca

Special Education

Elizabeth Ann Gore ____ Sumter

COLLEGE OF ENGINEERING

MASTER OF ENGINEERING

Civil Engineering

Peggy Large Burati ____ Clemson

Environmental Systems Engineering

Kazimiera Maria Poznanska ____ Poznan, Poland

MASTER OF SCIENCE

Bioengineering

Towfiq Gangjee ____ Clemson
Gary Bennett McAlister ____ York, Pa.
Margaret Carol Moyer ____ Apopka, Fla.
Patrick Anthony Welsh ____ Norris
Fred Lee Worthy ____ Summerville

Chemical Engineering

Fadi Bahouth ____ Beirut, Lebanon
Cynthia LaJuan Hander ____ Norristown, Pa.
Keith Ward Hutchenson ____ Wagener
Mark Daryl Myers ____ Greenville
Ann Harvin Whetstone ____ St. Matthews

Civil Engineering

Thomas Edford Cousins ____ Clemson
John David Fersner III ____ Orangeburg
Barry Duane Palm ____ Greenville
Robert Foster Webb ____ Spartanburg

Electrical Engineering

Tsuan-Jung Chi ____ Clemson
Clara White Davis ____ Easley
Charlie Dean Isler ____ Blacksburg
Mohamed Abdelhamid Khalil ____ Mehalla, Egypt
Premnath Viswanath ____ Madras, India

Engineering Mechanics

Mohammad-Ali Jamnia _____ Tehran, Iran

Environmental Systems Engineering

David Brooks Pott _____ Asheville, N. C.

Materials Engineering

Sy-Jenq Loong _____ Taipei, Taiwan

Mechanical Engineering

Samir Barman _____ Calcutta, India
Arvind Chetty _____ Visakhapatnam, India
Ananda Kumar Datta _____ Calcutta, India
Ziaul Huque _____ Dacca, Bangladesh, India

COLLEGE OF FOREST AND RECREATION RESOURCES

MASTER OF FORESTRY

Paul Russell Howe _____ Rock Hill
Richard Kent Myers _____ Decatur, Ga.

MASTER OF RECREATION AND PARK ADMINISTRATION

Dana Lynn Sawyer _____ Pompton Plains, N. J.
Thomas James Sconzo _____ Brooklyn, N. Y.

MASTER OF SCIENCE

Forestry

John Albert Scrivani _____ Hollywood, Fla.

COLLEGE OF NURSING

MASTER OF SCIENCE

Family Health Nursing

Cansas Alice Deitz-Smith _____ Lowell, N. C.

COLLEGE OF SCIENCES

MASTER OF SCIENCE

Biochemistry

Jeffrey Wayne Cooper _____ Palatine, Ill.

Botany

David Carl Tremmel _____ Clemson

Mathematical Sciences

Timothy Hunter Burwell _____ Spartanburg
John Gatewood Fisher II _____ Clemson
Barry Wayne Peyton _____ Clemson

Microbiology

Diane Jane Albrewczynski _____ Manchester, N. H.
Brian Asher Brody _____ Brooklyn, N. Y.
James Fred Davis _____ Lilburn, Ga.
Rachel Marie Patterson _____ Memphis, Tenn.
Karen Rene Ruth _____ Connersville, Ind.

Zoology

Marianne Doris Klauser _____ Hemberg, S. G., Switzerland
Martin Steiner _____ Park Forest, Ill.
John Stephen Wright _____ Augusta, Ga.

DOCTORS' DEGREES CONFERRED DECEMBER 21, 1982

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

DOCTOR OF PHILOSOPHY

Animal Physiology

Jeannette Isabel Poffenbarger ---------- Woodsboro, Md.
B.S., University of Maryland; M.S., University of Tennessee
Dissertation: Biologically Active Luteinizing Hormone in Bovine Embryos and Fetuses

Applied Economics

James L. Novak ---------- Seneca
B.S., M.S., University of New Hampshire
Dissertation: Incorporating Multiple Decision Criterion in an Assessment of the Feasibility of Row Crop Irrigation Use in South Carolina: A Goal Programming Approach

COLLEGE OF COMMERCE AND INDUSTRY

DOCTOR OF PHILOSOPHY

Engineering Management

David Morris Rhyne ---------- Central
B.S., M.S., University of Tennessee
Dissertation: The Identification and Development of Employment Opportunities for the Visually Impaired in the Textile Industry

COLLEGE OF ENGINEERING

DOCTOR OF PHILOSOPHY

Engineering

Paul Tyner Bowen ---------- Forsyth, Ga.
B.S., Mercer University; M.S., Clemson University
Dissertation: Sludge Conditioning: Effects of Sludge and Polymer Properties (Field of Specialization: Environmental Systems Engineering)

Hsu-cherng Chiang ---------- Taichung, Taiwan
B.S.E., National Cheng Kung University; M.S., National Taiwan University
Dissertation: A New Method for Developing Entrainment Rate Models for Turbulent Flows and Its Application (Field of Specialization: Civil Engineering)

William Robert Heatley, Jr. ---------- Charleston
B.S., Baptist College of Charleston; M.S., Clemson University
Dissertation: Lead and Cadmium Fluxes through the Lake Issaqueena Watershed (Field of Specialization: Environmental Systems Engineering)

Lymuel McRae ---------- Clio
B.S., M.S., Clemson University
Dissertation: Nonparametric Detection Using Statistics Based on Signs and Ranks (Field of Specialization: Electrical Engineering)

Parm Pal Singh ---------- Ludhiana, Punjab, India
B.S., Guru Nank Engineering College, Ludhiana; M.S., Punjab Agricultural University
Dissertation: An Investigation on Plate-in-Tube Solar Collector (Field of Specialization: Mechanical Engineering)

David Ralph Yonge ---------- Fort Pierce, Fla.
B.T., Florida Institute of Technology; M.S., Clemson University
Dissertation: Competitive Adsorption on Granular Activated Carbon (Field of Specialization: Environmental Systems Engineering)

COLLEGE OF SCIENCES

DOCTOR OF PHILOSOPHY

Biochemistry

Chuan Van Dang ---------- Los Angeles, Cal.
B.S., University of California, Los Angeles
Dissertation: Characterization of a Purified Lysyl- and Arginyl-tRNA Synthetase Complex from Rat Liver

Sabine Heinhorst ---------- Hamburg, Germany
B.S., M.S., Hamburg University
Dissertation: Location of the Genes for the Two Subunits of Ribulose-1, 5-Biphosphate Carboxylase in **Cyanophora paradoxa**

Chemistry

James Ray Stowers ---------- Natchez, Miss.
B.S., Mississippi State University; M.S., University of New Orleans
Dissertation: Syntheses Involving the 1, 2-Benzisothiazole 1, 1-Dioxide Ring System

William Marshall Thompson ---------- Farmville, N. C.
B.S., East Carolina University
Dissertation: Thermal Rearrangements of Some 3, 5- and 2, 6-Disubstituted-beta-phenethylsulfonyl Azides

Microbiology

David Charles Montefiori ---------- Erie, Pa.
B.S., Edinboro State College; M.S., Clemson University
Dissertation: Molecular Probing of Viral, Procaryotic and Eucaryotic Genomes by Southern Gel Hybridization with the Cloned **crp** Gene of **Escherichia coli** B/r

Physics

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B.A., University of Tennessee at Chattanooga; M.S., Memphis State University
Dissertation: Cylindrical Josephson Junction in Magnetic Fields

DEGREES AWARDED BY MAJOR COURSES 1981-1982

Major Course	Associates'	Bachelors'	Masters'	Specialists'	Doctors'
College of Agricultural Sciences					
Agricultural Economics	0	0	10	0	0
Agricultural Economis and Rural Sociology	0	10	0	0	0
Agricultural Mechanization and Business	0	9	0	0	0
Agriculture	0	0	11	0	0
Agronomy	0	0	4	0	1
Animal and Food Industries	0	0	11	0	0
Animal Industries	0	40	0	0	0
Animal Physiology	0	0	0	0	2
Animal Science	0	0	0	0	0
Applied Economics	0	0	0	0	1
Community and Rural Development	0	0	0	0	0
Economic Biology	0	9	0	0	0
Entomology	0	0	9	0	1
Food Science	0	4	0	0	0
Horticulture	0	0	1	0	0
Nutrition	0	0	7	0	0
Nutritional Science	0	0	5	0	0
Plant Pathology	0	0	4	0	1
Plant Physiology	0	0	0	0	2
Plant Sciences	0	56	0	0	0
Poultry Science	0	0	0	0	0
Preprofessional Studies	0	7	0	0	0
Wildlife Biology	0	0	4	0	0
Total	0	135	66	0	8
College of Architecture					
Architecture	0	5	35	0	0
Building Science and Management	0	24	0	0	0
City and Regional Planning	0	0	5	0	0
Design	0	72	0	0	0
Fine Arts	0	0	8	0	0
Total	0	101	48	0	0
College of Commerce and Industry					
Accounting	0	73	0	0	0
Administrative Management	0	233	0	0	0
Business Administration	0	0	30	0	0
Economics	0	49	7	0	0
Engineering Management	0	0	0	0	2
Financial Management	0	96	0	0	0
Industrial Management	0	54	0	0	0
Management	0	0	11	0	0
Management Science	0	0	0	0	4
Textile Chemistry	0	4	1	0	0
Textile and Polymer Science	0	0	0	0	2
Textile Science	0	3	2	0	0
Textile Technology	0	15	0	0	0
Total	0	527	51	0	8
College of Education					
Administration and Supervision	0	0	21	0	0
Agricultural Education	0	5	8	0	0
Early Childhood Education	0	44	0	0	0
Education	0	0	0	10	0
Elementary Education	0	85	63	0	0
Industrial Education	0	33	9	0	0
Personnel Services	0	0	47	0	0
Reading	0	0	21	0	0
Science Teaching	0	24	0	0	0
Secondary Education	0	35	9	0	0
Total	0	226	178	10	0

Major Course	Associates'	Bachelors'	Masters'	Specialists'	Doctors'
College of Engineering					
Agricultural Engineering	0	8	2	0	1
Bioengineering	0	0	3	0	2
Ceramic Engineering	0	20	2	0	0
Chemical Engineering	0	55	6	0	1
Civil Engineering	0	83	9	0	4
Computer Engineering	0	5	0	0	0
Electrical Engineering	0	86	13	0	0
Engineering	0	0	9	0	0
Engineering Analysis	0	4	0	0	0
Engineering Mechanics	0	0	1	0	3
Engineering Technology	0	54	0	0	0
Environmental Systems Engineering	0	0	9	0	3
Materials Engineering	0	0	1	0	0
Mechanical Engineering	0	115	6	0	0
Systems Engineering	0	0	3	0	0
Total	0	430	64	0	14
College of Forest and Recreation Resources					
Forest Management	0	20	0	0	0
Forestry	0	0	12	0	0
Recreation and Park Administration	0	71	7	0	0
Wood Utilization	0	7	0	0	0
Total	0	98	19	0	0
College of Liberal Arts					
Economics and Political Science	0	0	0	0	0
Economics and Spanish	0	0	0	0	0
English	0	44	10	0	0
English and History	0	2	0	0	0
English and Political Science	0	1	0	0	0
French and Political Science	0	0	0	0	0
History	0	11	1	0	0
History and Political Science	0	0	0	0	0
History and Psychology	0	1	0	0	0
Modern Languages	0	10	0	0	0
Political Science	0	27	0	0	0
Political Science and Spanish	0	1	0	0	0
Psychology	0	39	0	0	0
Psychology and Spanish	0	1	0	0	0
Sociology	0	32	0	0	0
Total	0	169	11	0	0
College of Nursing					
Family Health Nursing	0	0	4	0	0
Nursing	9	64	0	0	0
Total	9	64	4	0	0
College of Sciences					
Biochemistry	0	11	2	0	2
Botany	0	4	3	0	0
Chemistry	0	9	5	0	5
Computer Science	0	18	1	0	0
Geology	0	13	0	0	0
Mathematical Sciences	0	40	33	0	2
Medical Technology	0	9	0	0	0
Microbiology	0	27	9	0	0
Physics	0	5	2	0	3
Preprofessional Studies	0	1	0	0	0
Zoology	0	18	5	0	3
Total	0	155	60	0	15
Total Degrees Awarded 1981-1982	9	1,905	501	10	45
Grand Total Degrees Awarded 1981-1982	2,470				

TOTAL DEGREES AWARDED BY MAJOR COURSE, 1896-1982

Major Course	
ASSOCIATES	
Nursing	425
Total Associate Degrees Awarded	425
BACHELORS	
Accounting	415
Administrative Management	1,567
Agricultural Chemistry	102
Agricultural Economics	486
Agricultural Economics and Rural Sociology	26
Agricultural Education	641
Agricultural Engineering	565
Agricultural Mechanization and Business	96
Agriculture	244
Agriculture and Animal Industry	80
Agriculture and Chemistry	69
Agronomy	828
Animal Industries	260
Animal Science	913
Applied Mathematics	34
Architectural Engineering	118
Architecture	729
Arts and Sciences	2,542
Bachelor of Science	3
Biochemistry	51
Biology	301
Botany	53
Building Construction	306
Building Science	35
Building Science and Management	36
Ceramic Engineering	393
Chemical Engineering	851
Chemistry	523
Chemistry Engineering	43
Chemistry and Geology	11
Civil Engineering	2,160
Community and Rural Development	11
Computer Engineering	5
Computer Science	27
Dairy Science	427
Design	220
Early Childhood Education	460
Economic Biology	125
Economics	233
Economics and French	1
Economics and Political Science	1
Economics and Spanish	1
Education	242
Electrical Engineering	2,518
Elementary Education	1,172
Engineering Analysis	67
Engineering Industrial Education	70
Engineering Technology	359
English	277
English and History	3
English and Political Science	2
Entomology	169
Financial Management	532
Food Science	81
Forest Management	305
Forestry	288
French and History	2
French and Political Science	3
General Science	359
Geology	90
History	121
History and Political Science	1
History and Psychology	1
Horticulture	563
Industrial Education	855
Industrial Engineering	138
Industrial Management	1,703
Industrial Physics	56
Mathematical Sciences	261
Mathematics	229
Mechanical and Electrical Engineering	489
Mechanical Engineering	2,181
Medical Technology	110
Metallurgical Engineering	20
Microbiology	384
Modern Languages	101
Nursing	613
Physics	173
Plant Sciences	426
Political Science	332
Political Science and Spanish	1
Poultry Science	59
Prearchitecture	407
Premedicine	756
Preprofessional Studies	172
Psychology	415
Psychology and Spanish	1
Recreation and Park Administration	1,177
Science Teaching	255
Secondary Education	897
Sociology	213
Soils	9
Textile Chemistry	379
Textile Engineering	1,060
Textile Industrial Education	85
Textile Management	306
Textile Manufacturing	1,045
Textile Science	73
Textile Technology	130
Textiles	35
Veterinary Science	16
Vocational Agricultural Education	729
Weaving and Design	42
Wood Utilization	33
Zoology	399
	39,982
DOUBLE MAJORS	
Agricultural Chemistry and Arts and Sciences	1
Agricultural Chemistry and General Science	1
Agricultural Economics and Animal Husbandry	1
Agricultural Economics and Vocational Agricultural Education	1
Agricultural Engineering and Civil Engineering	2
Agricultural Engineering and Electrical Engineering	1
Agricultural Engineering and Mechanical Engineering	1
Agronomy and Agricultural Education	1
Agronomy and Vocational Agricultural Education	4
Animal Husbandry and Agricultural Education	3
Animal Husbandry and Ceramic Engineering	1
Animal Husbandry and Dairy	2
Animal Husbandry and Industrial Management	1
Animal Husbandry and Vocational Agricultural Education	5
Architectural Engineering and Architecture, Five Year	1

Architecture and Architectural Engineering	11
Architecture and Civil Engineering	1
Architecture, four-year, and Architecture, five-year	18
Architecture, four-year and Mechanical Engineering	1
Arts and Sciences and Agricultural Economics	1
Chemical Engineering and Chemistry and Chemistry Engineering	3
Chemical Engineering and Chemistry Engineering	1
Chemistry and Agricultural Chemistry	1
Chemistry and Chemical Engineering	1
Chemistry and Chemistry Engineering	1
Chemistry and General Science	1
Chemistry and Industrial Physics	1
Civil Engineering and Architecture	1
Civil Engineering and Chemistry and Geology	2
Civil Engineering and Electrical Engineering	1
Civil Engineering and Industrial Physics	1
Civil Engineering and Mechanical Engineering	1
Electrical Engineering and Applied Mathematics	1
Electrical Engineering and Industrial Physics	1
Electrical Engineering and Mechanical Engineering	17
Electrical Engineering and Textile Engineering	1
Entomology and Architecture, five-year	1
Entomology and Premedicine	1
General Science and Ceramic Engineering	1
General Science and Education	1
General Science and Electrical Engineering	1
Horticulture and Agronomy	1
Horticulture and Architectural Engineering	1
Horticulture and Civil Engineering	1
Industrial Education and Architecture	1
Industrial Education and Electrical Engineering	1
Industrial Education and Forestry	1
Industrial Engineering and Mechanical Engineering	1
Mechanical Engineering and Textile Engineering	4
Poultry and Vocational Agricultural Education	1
Premedicine and Arts and Sciences	1
Premedicine and Textile Chemistry	2
Textile Chemistry and Civil Engineering	1
Textile Chemistry and Textile Manufacturing	1
Textile Engineering and Civil Engineering	1
Textile Engineering and Mechanical and Electrical Engineering	1
Textile Engineering and Textile Industrial Education	1
Textile Engineering and Textile Manufacturing	1
Textile Engineering and Weaving and Designing	1
Textile Manufacturing and Mechanical Engineering	1
Total Bachelors' Degrees Awarded	40,103

MASTERS

Agricultural Economics	125
Agricultural Education	195
Agricultural Engineering	52
Agriculture	137
Agronomy	61
Animal and Food Industries	30
Animal Science	48
Architecture	235
Bacteriology	6
Biochemistry	24
Bioengineering	64
Botany	27
Business Administration	307
Ceramic Engineering	94
Chemical Engineering	98
Chemistry	129
City and Regional Planning	103
Civil Engineering	126
Computer Science	3
Dairy Science	24
Economics	50
Education	1,325
Administration and Supervision	299
Elementary Education	941
Personnel Services	587
Reading	298
Secondary Education	188
Education Specialist	103
Electrical Engineering	146
Engineering	157
Engineering Mechanics	19
English	155
Entomology	122
Environmental Systems Engineering	128
Family Health Nursing	4
Fine Arts	34
Forestry	78
History	30
Horticulture	107
Industrial Education	207
Industrial Management	36
Management	135
Materials Engineering	13
Mathematical Sciences	151
Mathematics	170
Mechanical Engineering	139
Microbiology	81
Nuclear Science	3
Nursing	22
Nutrition	41
Nutritional Science	45
Physics	95
Plant Pathology	32
Plant Physiology	2
Poultry Science	27
Recreation and Park Administration	88
Systems Engineering	38
Textile Chemistry	73
Textile Industrial Education	1
Textile Science	45
Textiles	1
Water Resources Engineering	52
Wildlife Biology	54
Zoology	124
Total Masters' Degrees Awarded	8,334

DOCTORS

Agricultural Economics	17
Agricultural Engineering	10
Agronomy	17
Animal Physiology	25
Applied Economics	14
Biochemistry	4

Bioengineering	13
Chemical Engineering	33
Chemical Physics	3
Chemistry	99
Civil Engineering	11
Electrical Engineering	24
Engineering Management	29
Engineering Mechanics	12
Entomology	53
Environmental Systems Engineering	22
Management Science	15
Materials Engineering	3
Mathematical Sciences	17
Mathematics	36
Mechanical Engineering	12
Nutrition	15
Physics	72
Plant Pathology	18
Plant Physiology	22
Systems Engineering	7
Textile and Polymer Science	15
Water Resources Engineering	1
Zoology	25
Total Doctors' Degrees Awarded	644
Grand Total Degrees Awarded 1896-1982	49,506

ENROLLMENT BY COURSES AND ACADEMIC CLASSIFICATION
Fall Semester 1982

Major Course	Freshman	Sophomores	Juniors	Seniors	Unclassified Undergraduates	Postgraduates	Postbaccalaureate	Unclassified Graduates	Masters	Doctors	Total
College of Agricultural Sciences											
Agricultural Business	10	6	8	6	0	0	0	0	0	0	30
Agricultural Economics	5	3	6	9	0	0	0	0	17	0	40
Agricultural Engineering	17	18	9	22	0	0	0	0	9	8	83
Agricultural Mechanization	14	14	26	18	0	0	0	0	5	0	77
Agriculture	2	2	0	0	0	0	0	0	0	0	4
Agronomy	6	7	9	11	0	0	0	0	16	4	53
Animal and Food Industries	0	0	0	0	0	0	0	0	26	0	26
Animal Industries	3	1	0	0	0	0	0	0	0	0	4
Animal Physiology	0	0	0	0	0	1	0	0	0	9	10
Animal Science	33	25	42	32	0	0	1	0	5	0	138
Applied Economics	0	0	0	0	0	0	0	0	0	11	11
Community and Rural Development	0	1	5	3	0	0	0	0	0	0	9
Dairy Science	8	8	5	13	0	0	0	0	3	0	37
Economic Biology	10	6	2	1	0	0	0	0	0	0	19
Economic Zoology	4	5	2	8	0	0	0	0	0	0	19
Entomology	4	2	3	6	0	0	0	0	15	8	38
Food Science	7	5	10	16	0	0	0	0	0	0	38
Horticulture	24	16	22	37	0	1	1	0	22	0	123
Nutrition	0	0	0	0	0	0	0	0	23	9	32
Plant Pathology	0	0	0	0	0	0	0	0	10	2	12
Plant Physiology	0	0	0	0	0	0	0	0	1	11	12
Plant Sciences	1	0	0	0	0	0	0	0	0	0	1
Poultry Science	1	3	1	6	0	0	0	0	1	0	12
Wildlife Biology	0	0	0	0	0	0	0	0	9	0	9
Nondegree	0	0	0	0	0	0	0	13	1	0	14
Total	149	122	150	188	0	2	2	13	163	62	851
College of Architecture											
Architecture	1	0	0	0	0	3	2	0	69	0	75
Building Science and Management	9	17	23	23	0	2	0	0	0	0	74
City and Regional Planning	0	0	0	0	0	0	0	0	26	0	26
Design Studies (BA)	30	42	32	19	0	0	0	0	0	0	123
Design Studies (BS)	54	40	40	55	0	2	0	0	0	0	191
Visual Studies	0	0	0	0	0	0	1	0	6	0	7
Nondegree	0	0	0	0	0	0	0	3	0	0	3
Total	94	99	95	97	0	7	3	3	101	0	499
College of Commerce and Industry											
Accounting	112	117	87	89	0	1	0	0	0	0	406
Administrative Management	311	207	273	229	0	1	0	0	0	0	1,021
Administrative Management (Occ. Safety and Health)	3	9	13	24	0	0	0	0	0	0	49
Economics (BA)	10	11	10	13	0	0	0	0	0	0	44
Economics (BS)	19	34	40	25	0	1	0	0	10	0	129
Engineering Management	0	0	0	0	0	0	0	0	0	17	17
Financial Management	203	151	127	98	0	1	0	0	0	0	580
Industrial Management	71	49	64	58	0	0	0	0	0	0	242
Management	0	0	0	0	0	0	1	0	29	0	30
Management Science	0	0	0	0	0	0	0	0	0	6	6
Textile Chemistry	11	4	2	5	0	0	0	0	10	0	32
Textile and Polymer Science	0	0	0	0	0	0	0	0	0	5	5
Textile Science	5	2	3	2	0	0	0	0	9	0	21
Textile Technology	27	13	25	20	0	1	0	0	0	0	86
Nondegree	0	0	0	0	0	0	0	8	0	0	8
Total	772	597	644	563	0	5	1	8	58	28	2,676

Major Course	Freshman	Sophomores	Juniors	Seniors	Unclassified Undergraduates	Postgraduates	Postbaccalaureate	Unclassified Graduates	Masters	Doctors	Total
College of Education											
Administration and Supervision	0	0	0	0	0	0	0	1	42	0	43
Agricultural Education	7	8	13	9	0	0	0	1	12	0	50
Early Childhood Education	23	29	40	51	0	0	0	0	0	0	143
Education	2	0	1	0	0	0	0	0	0	0	3
Elementary Education	63	55	81	77	0	1	0	2	49	0	328
Graphic Communications	9	2	1	0	0	0	0	0	0	0	12
Industrial Education	19	5	13	6	0	0	0	0	13	0	56
Education for Industry	7	12	13	14	0	0	0	0	0	0	46
Industrial Arts	5	7	12	10	0	0	0	0	0	0	34
Vocational and Technical Education	0	2	2	4	0	0	0	0	0	0	8
Personnel Services	0	0	0	0	0	0	0	0	82	0	82
Reading	0	0	0	0	0	0	0	0	15	0	15
Science Teaching	0	0	0	0	0	0	0	0	0	0	0
Biological Sciences	4	2	5	12	0	0	0	0	0	0	23
Chemistry	0	0	1	1	0	0	0	0	0	0	2
Earth Science	2	0	2	2	0	0	0	0	0	0	6
Mathematical Sciences	4	3	1	6	0	0	0	0	0	0	14
Physical Sciences	0	3	2	4	0	0	0	0	0	0	9
Secondary Education	6	7	2	4	0	0	0	0	0	0	19
Economics	0	2	0	0	0	0	0	0	0	0	2
English	6	8	11	10	0	1	0	0	6	0	42
French	1	2	1	0	0	0	0	0	0	0	4
German	0	0	0	0	0	0	0	0	0	0	0
History	9	3	10	11	0	0	0	0	3	0	36
Mathematical Sciences	8	15	9	8	0	0	0	0	2	0	42
Natural Sciences	2	0	1	2	0	0	0	0	6	0	11
Political Science	2	0	1	1	0	0	0	0	0	0	4
Psychology	3	3	4	5	0	0	0	0	0	0	15
Sociology	0	0	1	2	0	0	0	0	0	0	3
Spanish	1	0	0	0	0	0	0	0	0	0	1
Special Education	0	0	0	0	0	0	0	0	14	0	14
Vocational and Technical Education	0	0	0	0	0	0	0	0	2	8	10
Nondegree	0	0	0	0	0	0	0	106	1	0	107
Total	183	168	227	239	0	2	0	110	247	8	1,184
College of Engineering											
Bioengineering	0	0	0	0	0	0	1	0	23	2	26
Ceramic Engineering	12	14	23	23	0	0	0	0	5	0	77
Chemical Engineering	158	118	92	95	0	3	0	0	27	2	495
Civil Engineering	76	97	94	143	0	7	0	0	28	11	456
Computer Engineering	170	97	47	24	0	2	2	0	15	0	357
Electrical Engineering	167	160	176	136	0	4	1	0	38	10	692
Engineering	28	29	19	8	0	0	0	0	0	0	84
Engineering Analysis	5	6	2	0	0	0	0	0	0	0	13
Engineering Mechanics	0	0	0	0	0	0	0	0	0	1	1
Engineering Technology	59	53	60	67	0	2	0	0	0	0	241
Environmental Systems Engineering	0	0	0	0	0	0	2	0	38	7	47
Materials Engineering	0	0	0	0	0	0	0	0	1	0	1
Mechanical Engineering	165	168	226	170	0	10	0	0	30	7	776
Systems Engineering	0	0	0	0	0	0	0	0	11	8	19
Nondegree	0	0	0	0	0	0	0	7	0	0	7
Total	840	742	739	666	0	28	6	7	216	48	3,292
College of Forest and Recreation Resources											
Forestry	36	24	15	27	0	2	1	1	25	5	136
Recreation and Park Administration	42	52	60	66	0	0	0	0	29	0	249
Wood Utilization	6	4	2	5	0	0	0	0	0	0	17

Major Course	Freshman	Sophomores	Juniors	Seniors	Unclassified Undergraduates	Postgraduates	Postbaccalaureate	Unclassified Graduates	Masters	Doctors	Total
Nondegree	0	0	0	0	0	0	0	3	0	0	3
Total	84	80	77	98	0	2	1	4	54	5	405
College of Liberal Arts											
English	40	53	45	44	0	0	0	0	27	0	209
French	5	9	3	7	0	0	0	0	0	0	24
German	0	1	1	2	0	0	0	0	0	0	4
History	20	9	14	17	0	0	0	0	8	0	68
Liberal Arts	38	5	2	0	0	0	0	0	0	0	45
Political Science	71	65	49	31	0	1	0	0	0	0	217
Psychology	43	33	39	39	0	1	0	0	0	0	155
Sociology	8	18	16	12	0	1	0	0	0	0	55
Spanish	4	3	5	3	0	0	0	0	0	0	15
Nondegree	0	0	0	0	0	0	0	1	0	0	1
Total	229	196	174	155	0	3	0	1	35	0	793
College of Nursing											
Family Health Nursing	0	0	0	0	0	0	0	0	19	0	19
Nursing (BS)	80	74	64	53	0	1	0	0	0	0	272
Nondegree	0	0	0	0	0	0	0	5	0	0	5
Total	80	74	64	53	0	1	0	5	19	0	296
College of Sciences											
Biochemistry	31	17	8	9	0	0	0	0	7	5	77
Botany	3	1	4	3	0	0	0	0	8	0	19
Chemistry (BA)	0	0	0	4	0	0	0	0	0	0	4
Chemistry (BS)	20	8	7	7	0	1	0	0	17	27	87
Computer Science	195	132	70	53	0	8	4	0	40	0	502
Geology (BA)	1	2	0	0	0	0	0	0	0	0	3
Geology (BS)	6	8	8	6	0	0	0	0	0	0	28
Mathematical Sciences (BA)	3	4	9	7	0	0	0	0	0	0	23
Mathematical Sciences (BS)	54	46	27	45	0	2	0	1	43	27	245
Medical Technology	14	8	13	12	0	1	0	0	0	0	48
Microbiology	32	41	30	27	0	0	0	0	18	8	156
Physics (BA)	1	0	0	0	0	0	0	0	0	0	1
Physics (BS)	15	7	3	3	0	1	1	0	15	11	56
Predentistry	1	0	0	0	0	0	0	0	0	0	1
Premedicine	0	1	0	0	0	0	0	0	0	0	1
Premedicine Core	64	0	0	0	0	0	0	0	0	0	64
Prepharmacy	21	11	3	1	0	0	0	0	0	0	36
Prephysical Therapy	25	18	11	1	0	0	0	0	0	0	55
Zoology (BA)	1	0	0	0	0	0	0	0	0	0	1
Zoology (BS)	29	19	12	15	0	0	0	0	15	32	122
Nondegree	0	0	0	0	0	0	0	7	0	0	7
Total	516	323	205	193	0	13	5	8	163	110	1,536
Nondegree	31	2	2	1	0	17	0	0	0	0	53
Special Status	4	0	0	0	29	0	0	0	0	0	33
Total	35	2	2	1	29	17	0	0	0	0	86
Campus Total	2,982	2,403	2,377	2,253	29	80	18	159	1,056	261	11,618
Clemson-Furman (MBA)											173
Institutes											343
Total Off Campus											516
Grand Total											12,134

ENROLLMENT BY COUNTY, STATE, AND COUNTRY

Fall Semester, 1982-1983

County	
Abbeville	59
Aiken	330
Allendale	18
Anderson	745
Bamberg	25
Barnwell	52
Beaufort	68
Berkeley	126
Calhoun	26
Charleston	526
Cherokee	71
Chester	38
Chesterfield	53
Clarendon	25
Colleton	35
Darlington	112
Dillon	32
Dorchester	162
Edgefield	33
Fairfield	31
Florence	196
Georgetown	58
Greenville	1,234
Greenwood	177
Hampton	46
Horry	143
Jasper	6
Kershaw	112
Lancaster	76
Laurens	116
Lee	40
Lexington	289
McCormick	15
Marion	32
Marlboro	34
Newberry	69
Oconee	455
Orangeburg	155
Pickens	966
Richland	352
Saluda	40
Spartanburg	497
Sumter	155
Union	42
Williamsburg	38
York	266
Unknown	4
	8,180

State	
Alabama	36
Alaska	1
Arizona	2
Arkansas	7
California	15
Colorado	5
Connecticut	38
Delaware	53
Florida	382
Georgia	559
Hawaii	4
Idaho	3
Illinois	45
Indiana	33
Iowa	4
Kansas	5
Kentucky	29
Louisiana	20
Maine	8
Maryland	166
Massachusetts	25
Michigan	31
Minnesota	3
Mississippi	6
Missouri	10
Montana	1
Nebraska	2
New Hampshire	4
New Jersey	236
New York	171
North Carolina	550
North Dakota	3
Ohio	114
Oklahoma	3
Oregon	2
Pennsylvania	161
Rhode Island	3
South Carolina	8,180
South Dakota	2
Tennessee	133
Texas	17
Utah	2
Vermont	6
Virginia	186
Washington	3
West Virginia	35
Wisconsin	9
Wyoming	2
District of Columbia	4
Guam	1
Puerto Rico	6
	11,326

Country	
Bangladesh	1
Bolivia	1
Brazil	3
Cameroon	2
Canada	24
Chile	1
China	8
Colombia	2
Cyprus	1
Denmark	1
Egypt	7
El Salvador	1
Ethiopia	2
France	1
Gabon	1
Germany (East)	2
Germany (West)	1
Greece	5
Haiti	1
Honduras	2
Hong Kong	8
India	41
Iran	14
Iraq	1
Ireland	1
Israel	1
Italy	1
Jamaica	4
Japan	4
Jordan	2
Kenya	2
Korea (North)	4
Kuwait	2
Lebanon	9
Malawi	2
Malaysia	15
Mexico	2
Nepal	1
Netherlañd Antilles	3
Netherlands	3
New Zealand	1
Nigeria	14
Pakıstan	2
Paraguay	2
Peru	1
Philippines	2
Poland	2
Portugal	1
Singapore	1
South Africa	1
Surinam	1
Swaziland	1
Sweden	1
Switzerland	2
Syria	3
Taiwan	37
Thailand	1
Turkey	7
United Kingdom	19
United States	11,326
Venezuela	3
Viet Nam (North)	1
Viet Nam (South)	1
Yugoslavia	1
	11,618

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